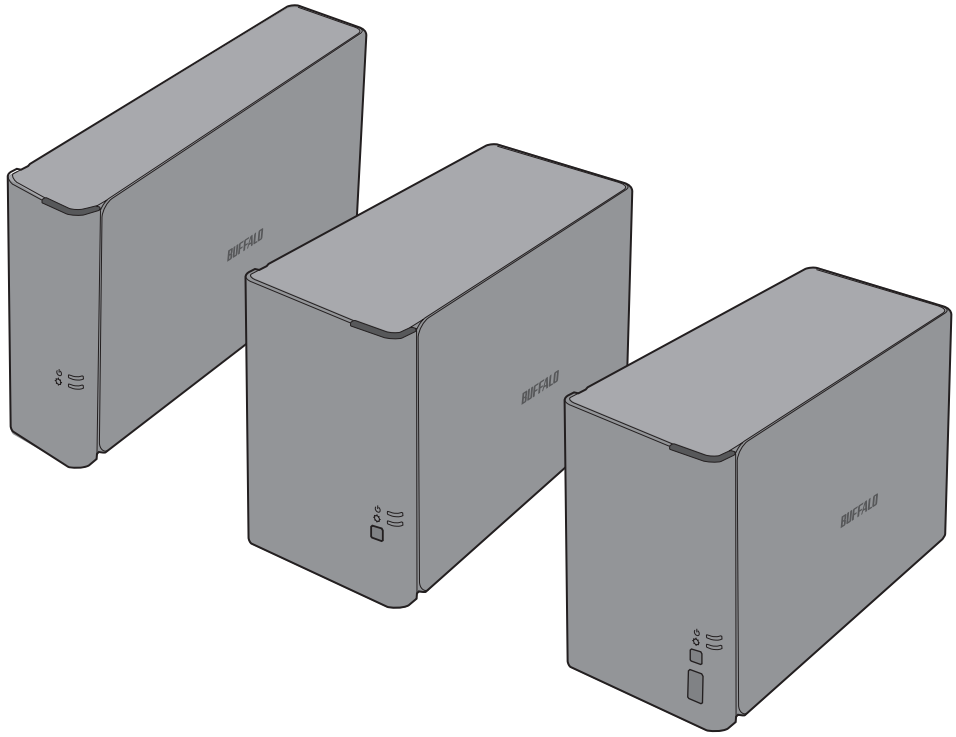
BUFFALO™

LinkStation 400

User Manual



www.buffalotech.com

35013107-08
2014.12

Contents

Chapter 1 Getting Started 5

Diagrams.....5

Changing Admin Password and Adding a Shared Folder 7

Turning the LinkStation On and Off 8

Chapter 2 Configuration 9

Opening Easy Admin 9

Getting Started 10

Opening Advanced Settings 12

Chapter 3 Sharing Files 14

Adding Shared Folders 14

Adding Users 15

Adding Groups 16

Access Restrictions..... 17

Local Users/Groups.....17

Active Directory 19

NT Domain 21

User Authentication with an External SMB Server..... 23

Chapter 4 Managing Storage..... 26

RAID Arrays..... 26

Working with RAID Arrays..... 26

Using JBOD.....26

Changing RAID Mode 27
RMM (RAID Mode Manager) 28
RAID Scanning 29
Adding an External Hard Drive 30
Connect an External Drive 30
Compatibility 30
Dismounting Drives 30
Dismounting with the Function Button 30
Dismounting from Settings 31
Checking Drives 32
Formatting Drives 32
Formatting External Drives 34
Erase Data on the LinkStation Completely 34
Disk Quotas 35
Quotas for Users 35
Quotas for Groups 36
Hard Drive Replacement 37
Hard Drive Replacement Examples 37

Chapter 5 Remote Access 41
WebAccess 41
Configuring from a Computer 41
FTP 44

Chapter 6 Backup 46
Back Up from the LinkStation 46
Preparing a Backup Destination 46

Configuring a Backup Job 47
Backing Up Your Mac with Time Machine 49
Copying from a USB Device 52

Chapter 7 Multimedia 54
DLNA 54
Playing Files 55
Connected DLNA-compatible Devices 56
Streaming to DLNA-compatible Devices 56
Disabling Playback from Specific Devices 57
iTunes Server 57
BitTorrent 58
Connecting a Printer 60
USB Device Server 62
Connecting with Network-USB Navigator 62
Disconnecting USB Devices 63

Chapter 8 Advanced Features 64
Email Notification 64
Sleep Mode 65
Encrypting Data Transmission 66
Encrypting Settings Data 66
Encrypting FTP Transfer Data 66
SSL Encryption 66
UPS (Uninterruptible Power Supply) 66
Restoring Factory Defaults 67
Initializing from Settings 67

Initializing with the Function Button 68
Online Update 68
Name, Date, Time, and Language 69
Jumbo Frames 70
Changing the IP Address 71

Chapter 9 Utilities 73
NAS Navigator2 for Windows 73
Mount as Network Drive 75
Changing the IP Address 76
NAS Navigator2 for Mac OS 76
Mount as Network Drive 77
Changing the IP Address 78

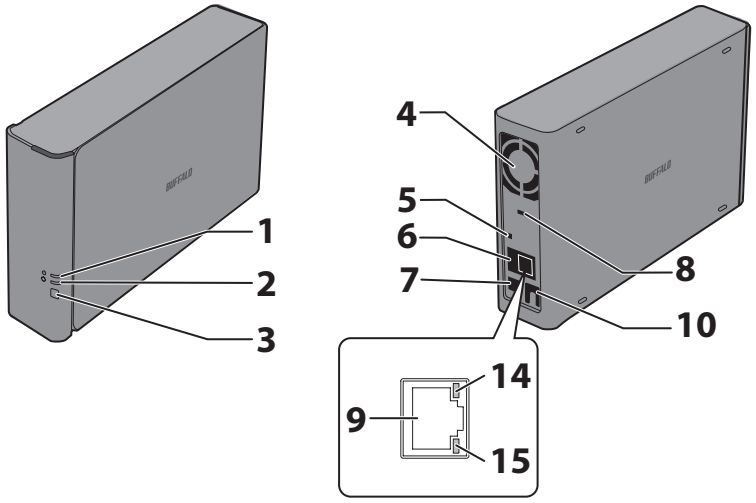
Chapter 10 Appendix 79
When the Power LED Blinks 79
Default Settings 81
Specifications 81
Models 82

Chapter 11 Regulatory Compliance Information 83
For Customers in the United States 83
For Customers in Europe 83
한국에서 구입 고객 84

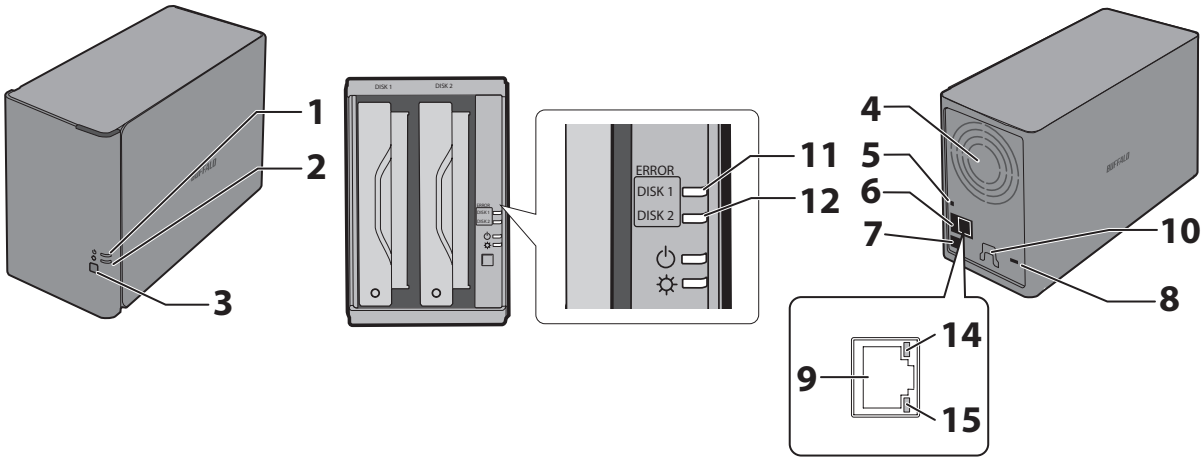
Chapter 1 Getting Started

Diagrams

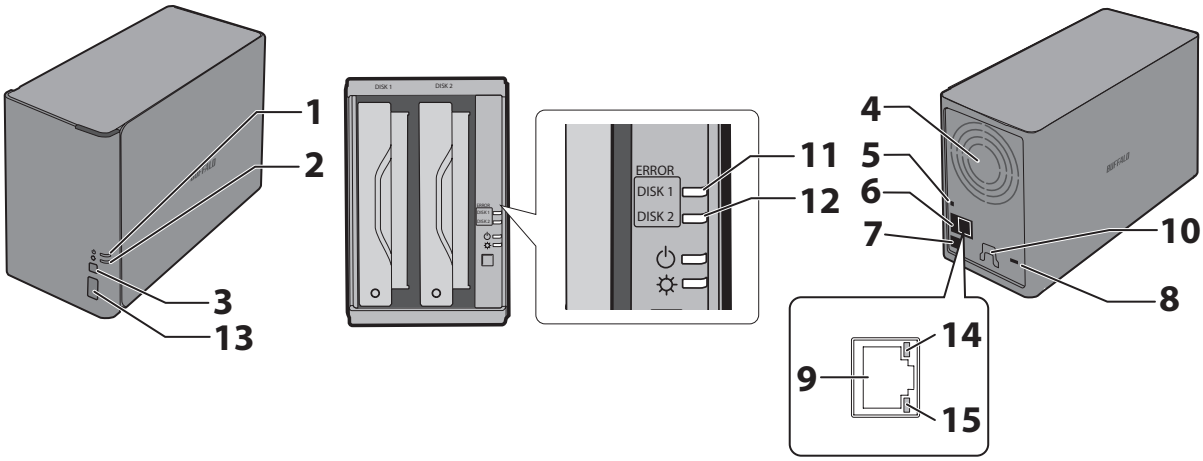
LS410D



LS420D/LS420DS



LS421DE



1 Power LED

The white power LED will light up while the LinkStation is on.
The white power LED blinks while booting or shutting down.
The red power LED blinks when an error occurs.
If there is a status message, the power LED glows amber.
If there is a new firmware available, the power LED blinks amber.

2 Function LED

This LED glows while the LinkStation is being initialized and while dismounting USB devices.

3 Function Button

Use this button for Direct Copy, dismounting USB devices, and initializing settings.

4 Fan

Do not block the fan.

5 Power Switch

Move the switch up and down to power on and off.

6 USB 2.0 Port

Compatible Buffalo USB hard drives, USB flash drives, digital cameras, USB UPS connection, and USB printers can be connected. USB hubs are not supported.

7 Power Connector

Use the included power cable to connect to a surge protector or outlet.

8 Anti-Theft Security Slot

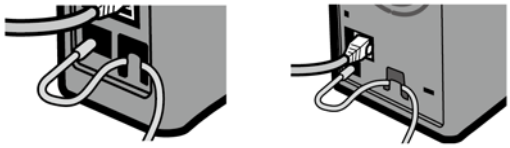
Use this slot to secure your LinkStation with a cable lock (not included).

9 LAN Port

Connect to a router, hub, or switch on your Ethernet network with the included Ethernet cable.

10 Hook

To secure the power cable, insert it into the slot as shown.



11 Disk 1 Error LED (LS420D, LS420DS, and LS421DE only)

If there is a hard drive error on drive 1, this LED will light.

12 Disk 2 Error LED (LS420D, LS420DS, and LS421DE only)

If there is a hard drive error on drive 2, this LED will light.

13 USB 3.0 Port (LS421DE only)

Compatible Buffalo USB 3.0 hard drives can be connected. USB hubs are not supported.

Notes:

- The USB 3.0 port doesn't support isochronous transfers when the USB device server is enabled.
- With Mac OS, only the USB 2.0 ports work with the USB device server.

14 Link and Activity LED

This LED shows network activity. It blinks green when the LinkStation is accessed over the network.

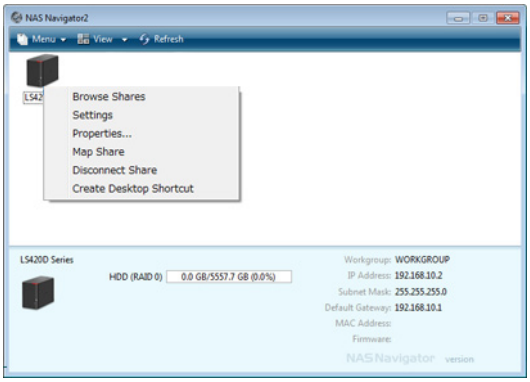
15 Not in use.

Changing Admin Password and Adding a Shared Folder

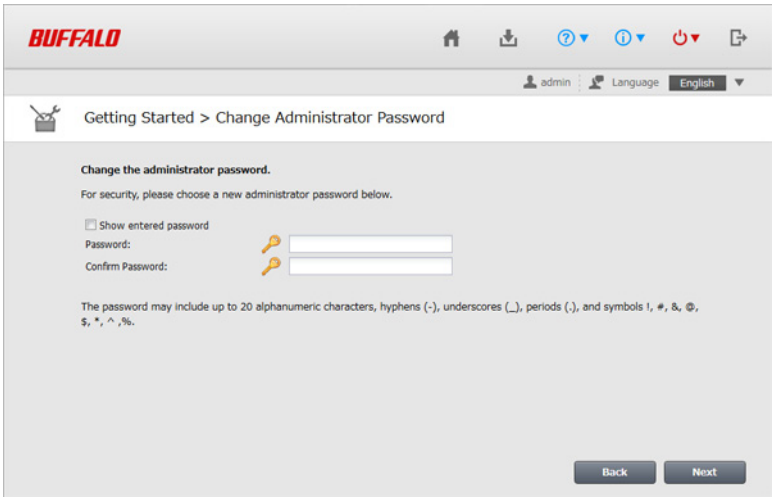
After initial setup, changing your password and creating other shared folders are recommended.

1 Double-click the icon to start NAS Navigator2.

2 Right-click on your LinkStation's icon and select *Settings*. On the Mac, select the LinkStation's icon while holding down the control key, then select *Settings*.



3 Changing the password from the default is recommended.

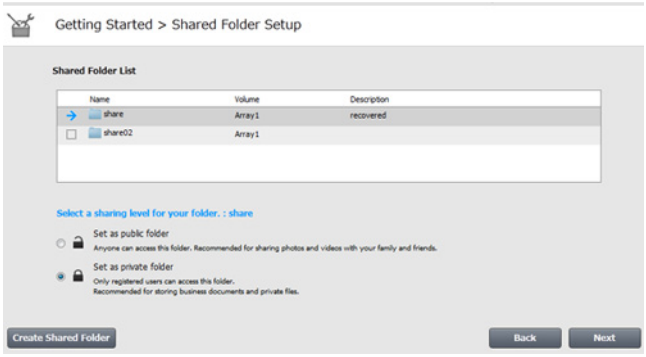

BUFFALO
admin
Language
English
Getting Started > Change Administrator Password
Change the administrator password.
For security, please choose a new administrator password below.
Show entered password
Password:
Confirm Password:
The password may include up to 20 alphanumeric characters, hyphens (-), underscores (_), periods (.), and symbols !, #, &, @, $, *, ^ ,%.
Back
Next

Note: You can open this same screen by clicking *Getting Started* from Easy Admin.

4 Enter the new password (twice), then click *Next*.

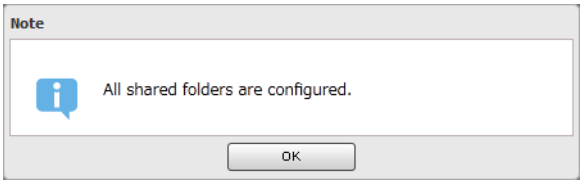
Note: The default username and password are "admin" and "password". To keep the defaults, leave both fields blank and click *Next*.

5 Configure levels of sharing for all listed shared folders (public or private) to finish the initial setup wizard.



Note: Select "Set as private folder" to restrict access to the folder to specific users.

6 Click *OK* when the following message is displayed.



Turning the LinkStation On and Off

Move the power switch on the back of the LinkStation to the "on" position to turn it on. To turn it off, move the switch to the "off" position and wait for the unit to fully shut down before unplugging it. Never unplug the AC adapter without properly shutting down the LinkStation first.

When all the LEDs on the front of the LinkStation turn off, the shutdown process is complete.

Chapter 2 Configuration

Configure and manage your LinkStation using the Settings interface, accessible from a browser window. Open the interface using the procedure below or type the LinkStation's IP address in the URL field of your browser. Within Settings, the Easy Admin page gives you quick access to commonly used settings.

Note: Internet Explorer 9, Firefox 18, Google Chrome 24, Safari 5, and later are supported. If you have difficulty viewing Settings, check the following:

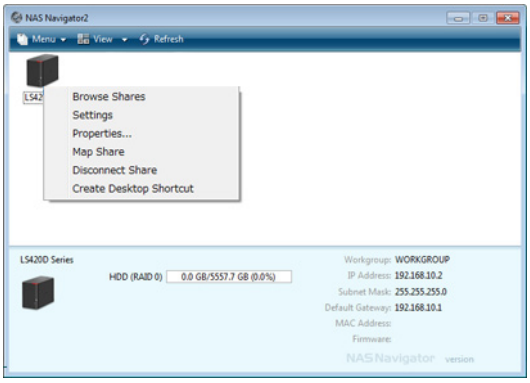
- If there are a large number of registered users, groups, or shared folders, use Firefox 18 or later instead of Internet Explorer.
- If you have a proxy server enabled in the browser settings, disable the proxy server.
- With Internet Explorer, set security to *Local intranet*. On Windows Server 2012 or Windows Server 2008, higher-level security is configured by default. Set the security to a lower level temporarily.

Opening Easy Admin

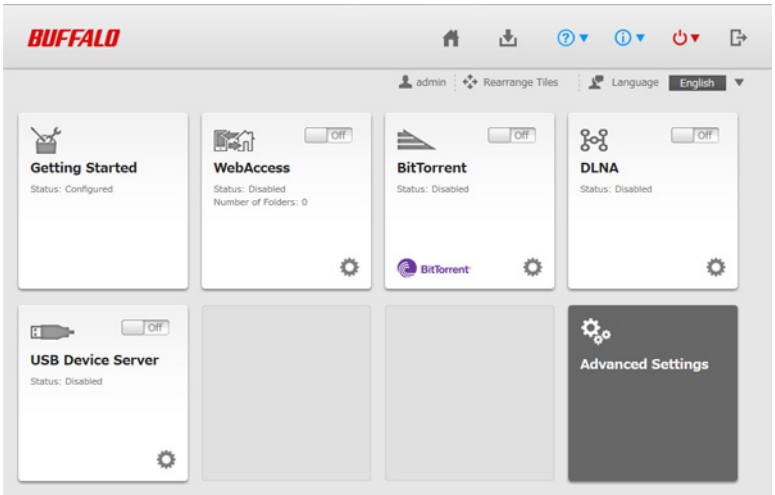
The Easy Admin page makes it easy to change common settings. Follow the steps below to open Easy Admin.

1 Double-click the icon to start NAS Navigator2.

2 Right-click on your LinkStation's icon and choose *Settings*. For Mac OS, click your LinkStation's icon while holding down the control key, then select *Settings*.

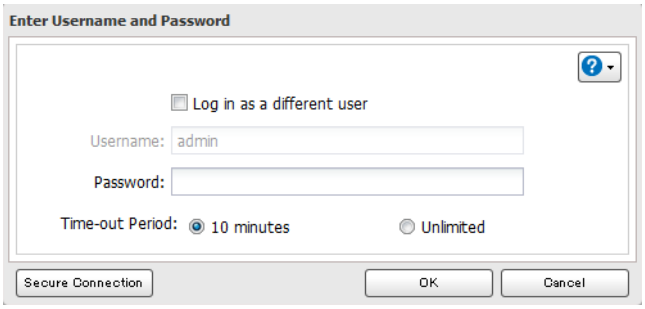


3 The Easy Admin screen will open.



Notes:

- If you click any buttons, you will need to enter a username and password.

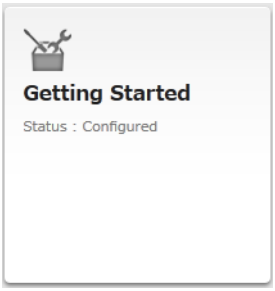


- If the time-out period is set to "10 minutes", you will be logged out of Settings after 10 minutes of inactivity. You will also be logged out when you reboot the LinkStation or close the web browser, even if you select "Unlimited".
- Click *Secure Connection* to log in with an encrypted connection.
- You can also use Bonjour to log in to Settings from Mac OS. In Safari, click *View* - *Show Bookmarks Bar*. From Bookmarks, click *Bonjour* - *LinkStation name*.

Getting Started

The wizard lets you configure the following settings:

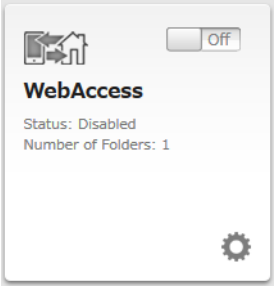
- Changing administrator password
- Creating shared folders
- Access restrictions



Refer to "Installation" for more details.

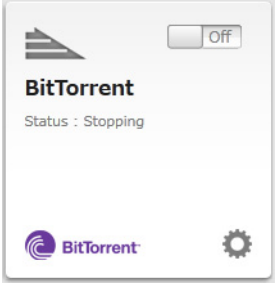
WebAccess

Configure WebAccess to access your LinkStation remotely. Refer to the "WebAccess" section in chapter 5 for more information.



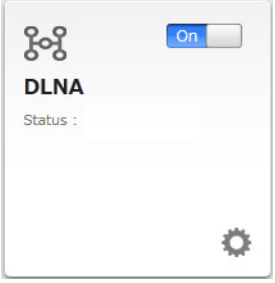
BitTorrent

Configure BitTorrent to download large files efficiently. Refer to the "BitTorrent" section in chapter 7 for more information.



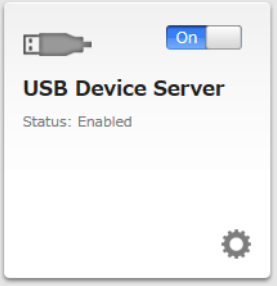
DLNA

Configure DLNA to stream media files to DLNA-compatible devices on the LAN. Refer to the "DLNA" section in chapter 7 for more information.



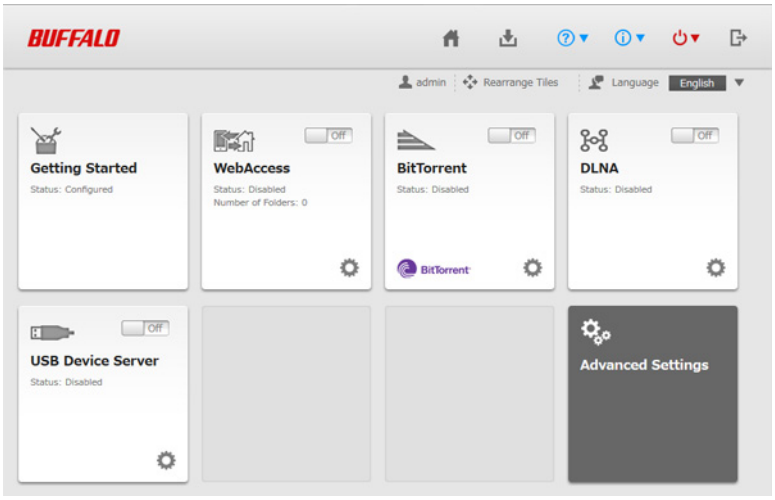
USB Device Server

Configure USB device server options. Refer to the "USB Device Server" section in chapter 7 for more details.

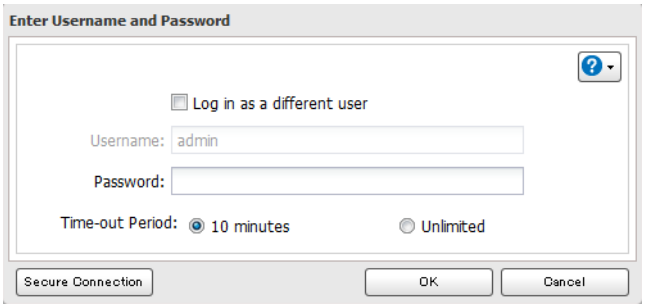


Opening Advanced Settings

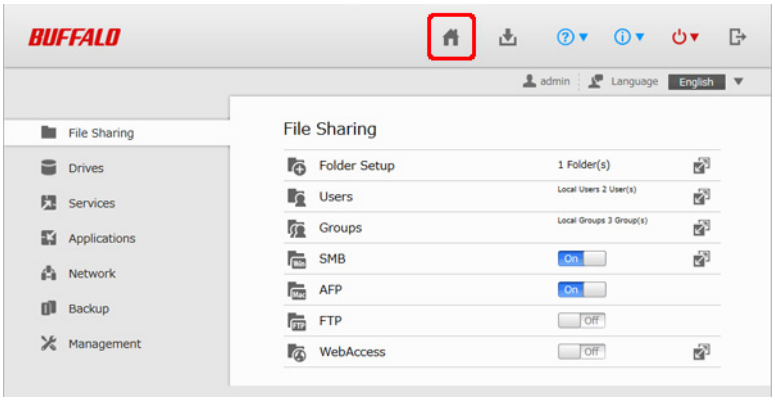
1 Click *Advanced Settings* in Easy Admin.



2 Enter the administrator username and password, then click *OK*.



3 The Advanced Settings screen will open.



Notes:

- Username/Password Combinations:

Username	Password	Settings Available
admin	password	All
guest	blank	System information (read-only)

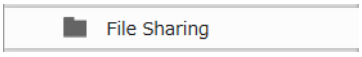
Your username	Your password	If a user is assigned as an administrator, all settings are available. If assigned as a general user, the user can only access read-only system information and change their own password. If assigned as a power user, the user can create and edit shared folders, users, and general users groups.

- To go back to Easy Admin, click the Home icon.

Chapter 3 Sharing Files

Adding Shared Folders

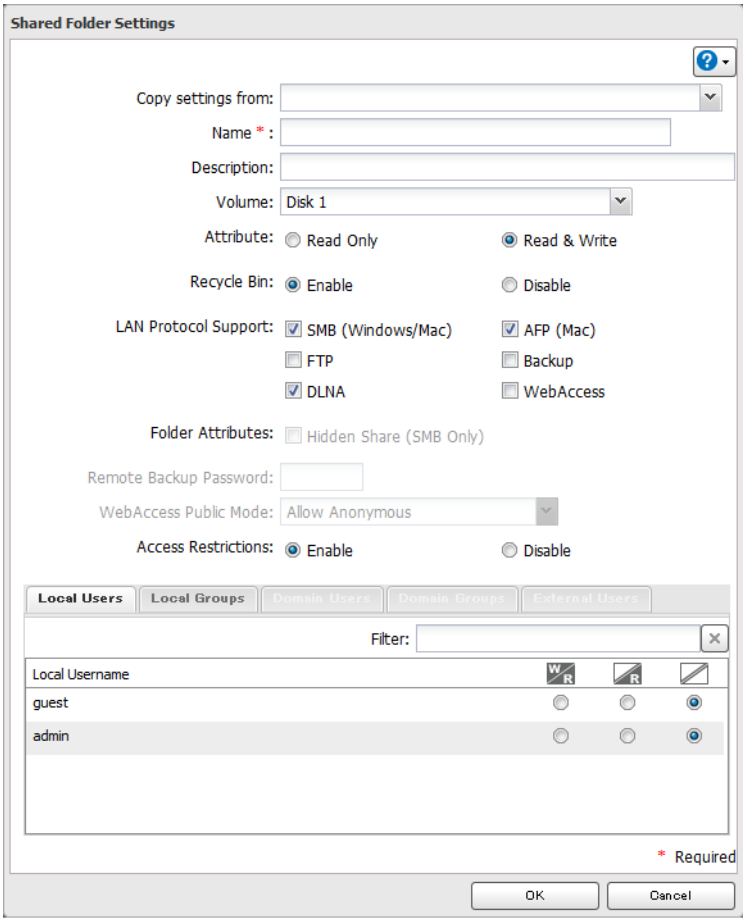
1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Folder Setup".

3 Click *Create Folder*.

4 Configure the desired settings, then click *OK*.



Notes:

- Names may contain up to 27 alphanumeric characters, hyphens (-), and underscores (_). Do not use a symbol as the first character in a name.
- The description may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a symbol or space as the first character.

- You may create up to 400 shared folders.
- The names of shared folders should not use characters from more than one language. For example, mixing Japanese and Korean characters in names is not supported.
- If multi-byte characters are used in shared folder names, configure the client language to match the characters in *Management - Name/Time/Language*.

Recycle Bin

To protect your data from accidental deletion, you may configure your LinkStation to use a recycle bin instead of deleting files immediately. The recycle bin will only work with SMB connections.

Note: With Mac OS, make sure "Exclude Mac OS temp files from recycle bin" is enabled. Otherwise, files in the recycle bin may be corrupted.

Read-only Shares

By default, new shares are set with read & write access, but you may change the attribute to "Read Only" in "Attribute". Read-only shares and HFS+ formatted USB hard drives will have "Read-only" added to the shared folder description.

Hidden Shares

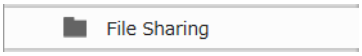
To hide a shared SMB folder, select "Hidden Share (SMB Only)" and click *OK*. To open a hidden folder, click *Start - Search programs and files* and enter "\\LinkStation's name\Shared folder names$\" for the name. For example, if the LinkStation name is "LSXXX001" and shared folder name is "share", enter "\\LSXXX001\share$\" to open it.

Note: AFP and FTP folders cannot be hidden.

Adding Users

The LinkStation can register a maximum 300 users, which includes the default users "admin" and "guest".

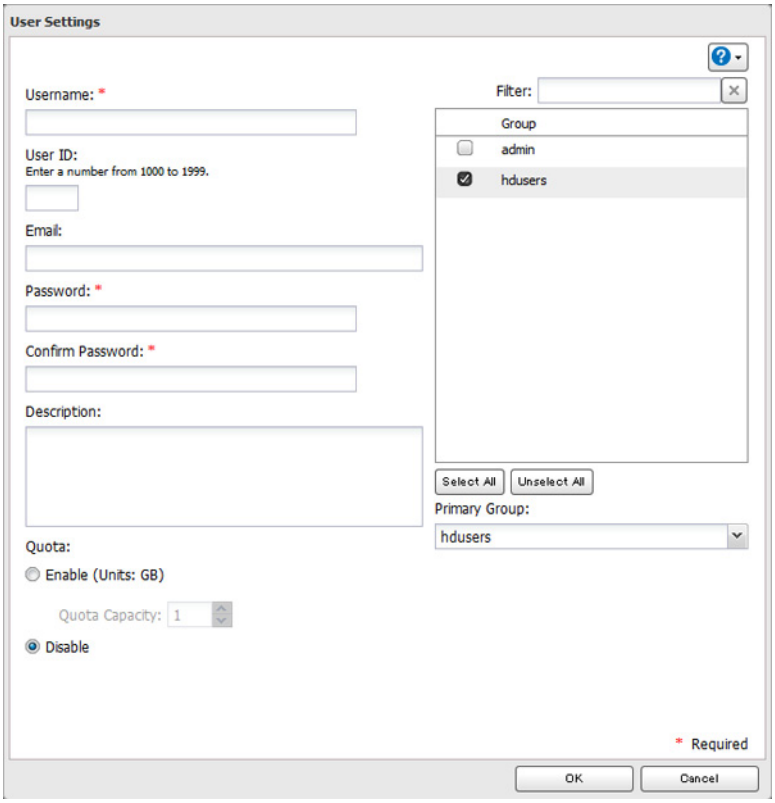
1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Users".

3 Click *Create User*.

4 Enter the desired settings, then click *OK*.

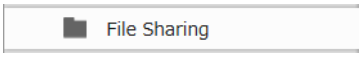


Notes:

- Usernames may contain up to 128 characters, including hyphens (-), underscores (_), periods (.), !, #, &, @, $, *, ^, and %. Do not use a symbol as the first character.
- The user ID should be a number from 1000 to 1999. Each user ID should be unique. If this field is left blank, a user ID is assigned automatically.
- When you log in to Settings as a registered user, you can see the LinkStation's name, IP address, workgroup, and disk status, and modify the password.
- Do not duplicate user IDs, group IDs, usernames, or group names. Each should be distinct and unique.
- The description may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a symbol or space as the first character.
- Passwords may contain up to 20 alphanumeric characters and the following characters: - _ @ ! # $ % & ' ( ) * + , . / ; < > = ? " [ ] ^ { } | ~. Do not use a symbol other than an underscore (_) as the first character.
- Use the same username and password for both Windows and the LinkStation or you may not be able to access shared folders.
- If a user belongs to multiple groups, the most strict access restrictions will apply. For example, if a user is added to a group with read and write access, and also to a read-only group, the user will effectively have read-only access.

Adding Groups

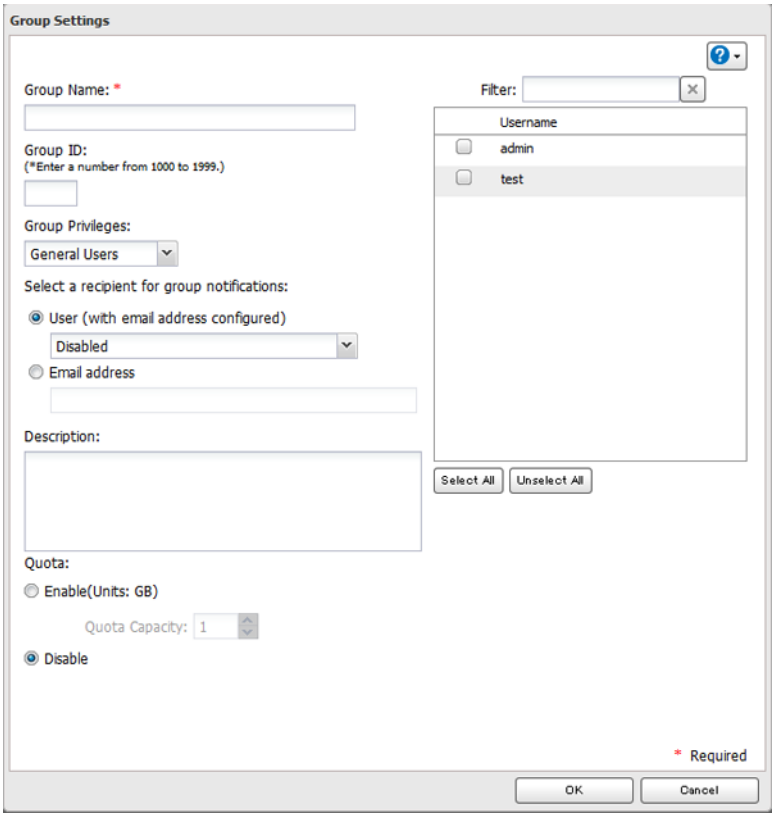
1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Groups".

3 Click *Add Group*.

4 Enter the desired settings, then click *OK*.



Notes:

- Group names may contain up to 20 alphanumeric characters, hyphens (-), underscores (_), and periods (.). Do not use a symbol other than an underscore (_) as the first character.
- Group descriptions may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a symbol or space as the first character.
- If the group ID field is left blank, a group ID is automatically assigned. Use numbers between 1000 and 1999 to set a group ID manually. Don't use duplicate group IDs.
- You may register up to 300 groups with the LinkStation.
- If you are logged in as a member of the general users group, you can only change your own password. If you're logged in as an administrator, you can change any settings, including other users' passwords. If you are logged in as a member of the power users group, you can create and edit shared folders, users, and groups.

Access Restrictions

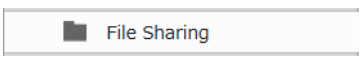
You may restrict access to specific shared folders, including external USB drives.

Notes:

- Access restrictions can be set separately for each shared folder, but not for subfolders within the shared folders.
- Configure access restrictions through Settings. Configuring access restrictions through Windows is not supported and may cause unexpected behavior.

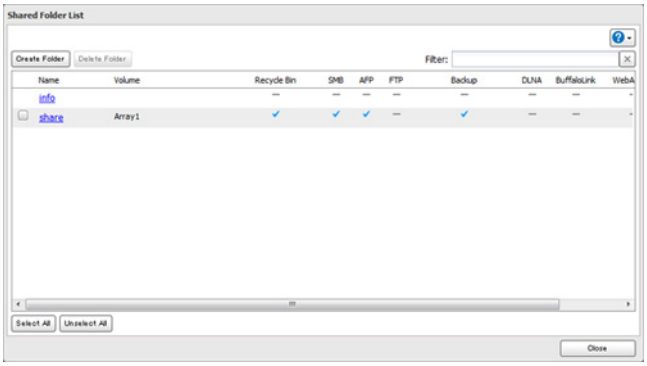
Local Users/Groups

1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Folder Setup".

3 Click the shared folder that you want to set access restrictions for.

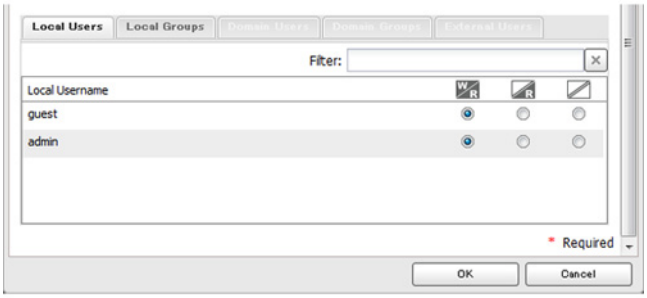


4 Click *Edit*.

5 Enable "Access Restrictions".

6 Select the level of access for the user or group you added.

: Read and write access allowed : Read access allowed : Access prohibited



Notes:

- An example of access restrictions by user is shown in the screen. To apply access restrictions by group, click the *Local Groups* tab and select group permissions.
- If both read-only and read & write permissions are given to a user, the user will have read-only access.

7 Click *OK*.

Notes

- The following characters are handled differently by Mac OS and Windows. Avoid using these characters when sharing data between Mac OS and Windows:
  —~ ‖ − ¢ £ ¬
- Windows does not support some characters that Mac OS and the LinkStation allow. If you create a filename on a Mac with any of the following characters, it will not display correctly on a Windows computer and you may have to connect to the LinkStation via AFP in order to display or copy any of the following characters on a Mac computer.
  ? [ ] / \ = + < > ; : " , | *

- Do not use any of the following words as a username or group name: root, bin, daemon, sys, adm, tty, disk, lp, sync, shutdown, halt, operator, nobody, mail, news, uucp, ftp, kmem, utmp, shadow, users, nogroup, all, none, hdusers, admin, guest, man, www, sshd, administrator, ftpuser, apache, mysql
- Do not use any of the following words as the name of a shared folder. These words are reserved for internal use by the LinkStation: info, spool, lost+found, global, printers, homes, lp, authtest, ram, msdfs_root, mt-daapd, usbdisk# (where # is a number, for example: usbdisk1)
- Don't use the following unsupported characters in shared folder names, workgroup names, or filenames:

- File and folder names may contain up to 255 single-byte characters.
- Configure hidden and read-only file attributes in Settings. Configuring them from within Windows is not supported and may cause unexpected behavior.
- Folder and workgroup names whose names contain non-Roman characters may not be displayed correctly.
- If shared folders are accessed from a Macintosh, information files for the Macintosh may be generated automatically. Do not delete these files. If they are deleted using Windows, this may prevent further access from a Macintosh.
- If an SMB connection is used with OS X 10.3.9, the names of mounted volumes may appear as unreadable characters in Finder and other applications. This is not a problem with the filename or data.
- The LinkStation belongs to the default zone in AppleShare Server; the zone cannot be specified.
- When files are copied to the LinkStation or to a USB drive connected to the LinkStation, file information such as date created, date modified, and other date information may be updated or changed.
- Hard drive capacity is shown in Settings in actual gigabytes. The Properties window in Windows may show GiB instead, which will be a smaller number.
- If any settings are changed during a file transfer, the transfer process may abort.
- File copying to the LinkStation is protected by a journaling file system. If the Ethernet cable is disconnected or a power outage occurs while copying data, the following may occur:
  - Preset data such as the LinkStation name, users, and groups may be erased.
  - An incomplete file may be copied and the file can no longer be deleted. If this happens, restart the LinkStation, delete the file, and perform the copy operation again.
- After a drive is formatted, the "% Used" and "Amount Used" in Settings will not be 0. This is because some drive space is used for the system area.

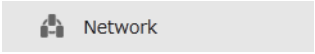
Active Directory

If an Active Directory environment, the LinkStation uses account information from the Active Directory domain controller to set access restrictions for LinkStation's shared folders. There is no need to perform individual account management for the LinkStation. If multiple LinkStations are installed on the network, the account information is centrally managed in Active Directory, greatly reducing the operations required for installation and management.

Notes:

- The LinkStation supports a domain environment with a maximum 1000 users and 1000 groups. 10,000 users and 10,000 groups can be downloaded from the domain controller but are not supported.
- If usernames or group names from Active Directory include multi-byte characters, you will not be able to configure access restrictions for them.

1 In Advanced Settings, click *Network*.



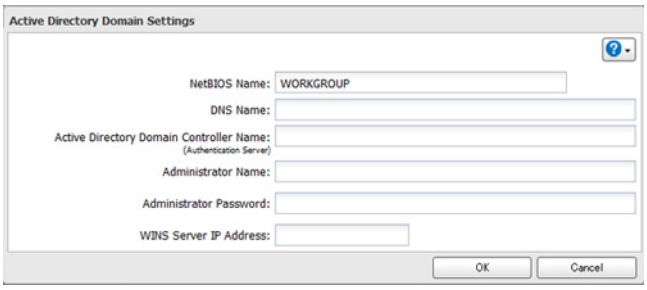
2 Click to the right of "Workgroup/Domain".

3 Click *Edit*.

4 Select "Active Directory" and click *Next*.

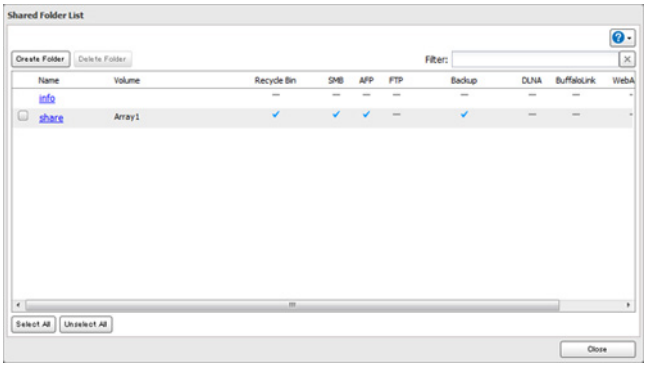
5 Click *Yes*.

6 Enter the desired settings, then click *OK*.



7 In Advanced Settings, navigate to *File Sharing - Folder Setup*.

8 Click a shared folder that you want to set access restrictions for.



9 Click *Edit*.

10 Enable "Access Restrictions".

11 Select the level of access for the user or group:

: Read and write access allowed : Read access allowed : Access prohibited

12 Click *OK*.

Notes:

- If you change the LinkStation's name, you will no longer be able to use domain users and groups or access restrictions. To repair this, rejoin the domain.
- To have the LinkStation join an Active Directory domain, configure it to use a DNS server that can resolve names for the Active Directory domain.
- After building an Active Directory domain, the administrator password for joining the domain must be changed at least once, or joining the Active Directory domain will fail.
- If both read-only and read & write permissions are given, the user will have read-only access. The most restrictive access setting will apply.
- The DNS name and NetBIOS name of Active Directory domains should be identical.
- If there are more than 5 minutes difference between the LinkStation's clock and the domain controller's clock, joining the domain or authenticating domain users and groups may fail. For best results, use an NTP server to set the time for all network devices.
- To use the LinkStation as a member server in an Active Directory domain, the LinkStation should be logged in to the domain and accessed from a computer that is not a member of the domain with a valid domain account.
- If the LinkStation is a member server of an Active Directory domain, you cannot connect as a guest user via AFP.
- If your LinkStation is a member server in an Active Directory domain and you change the authentication method to "Workgroup", the account on the domain controller will not be deleted automatically.
- When the LinkStation joins an Active Directory domain, FTP is disabled. Before using FTP, move the FTP switch back to the On position.
- Don't disable the SMB protocol while Active Directory is used for access restrictions. If you do, you will need to enable SMB again and reconfigure AD from scratch.

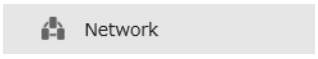
NT Domain

In an NT domain environment, the LinkStation uses account information from the NT domain server to set access restrictions for files and folders on the LinkStation. There's no need to perform individual account management for the LinkStation. If multiple LinkStations are installed on the network, the account information is centrally managed in the NT domain, greatly reducing the operations required for installation and management.

Note: The LinkStation supports a domain environment with a maximum of 1000 domain users and 1000 groups. 10,000 users and 10,000 groups can be downloaded from the domain controller but are not supported.

1 Create an account on the domain controller for the LinkStation.

2 In Advanced Settings, click *Network*.



3 Click to the right of "Workgroup/Domain".

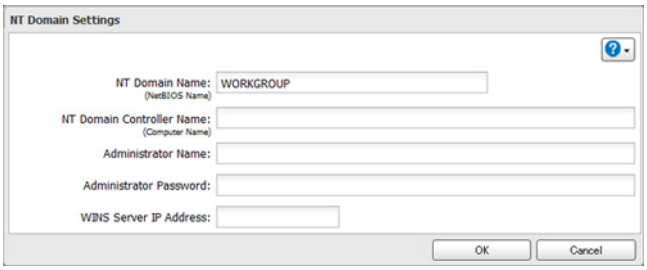
4 Click *Edit*.

5 Select "NT Domain", then click *Next*.

Note: To use Active Directory from Windows 2000 or Windows Server 2003, select "Active Directory" instead of "NT Domain".

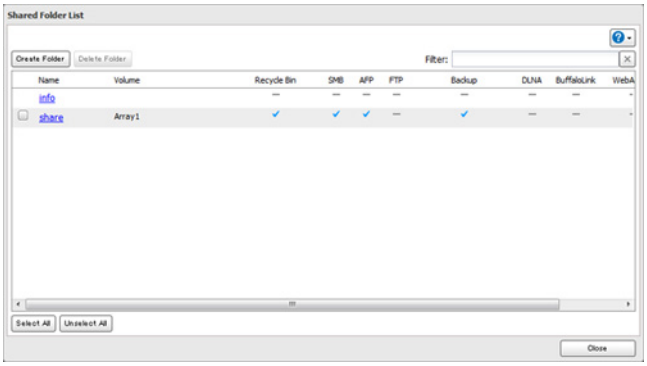
6 Click *Yes*.

7 Enter the desired settings, then click *OK*.



8 In Advanced Settings, navigate to *File Sharing* - *Folder Setup*.

9 Click a shared folder for which you want to set access restrictions.



10 Click *Edit*.

11 Enable "Access Restrictions".

12 Select the level of access for "Domain Users" or "Domain Groups" you added.

: Read and write access allowed : Read access allowed : Access prohibited

13 Click *OK*.

Notes:

- If you change the LinkStation's name, you will no longer be able to use domain users and groups or access restrictions. To repair this, rejoin the domain.
- If both read-only and read & write permissions are given to a user, the user will have read-only access. The most restrictive attribute will apply.

- If a domain username is more than 20 bytes long, the LinkStation truncates it to 20 bytes.
- The LinkStation supports a domain environment with a maximum of 1000 users and 1000 groups. 10,000 users and 10,000 groups can be downloaded from the domain controller but are not supported.
- To use the LinkStation as a member server in an NT domain, the LinkStation should be logged in to the domain and accessed from a computer that is not a member of the domain with a valid domain account.
- If the LinkStation is a member server of an NT domain, you cannot connect as a guest user via AFP.
- When you change the user or group settings on the domain controller, these changes may not take effect immediately on the LinkStation until it is rebooted.
- If your LinkStation is a member server in an NT domain and you change the authentication method to "Workgroup", the account on the domain controller will not be deleted automatically.
- If the LinkStation has joined a domain network, you cannot connect to it via FTP.
- Don't disable the SMB protocol while an NT domain server is used for access restrictions. If you do, you will need to enable SMB again and reconfigure the NT domain settings from scratch.

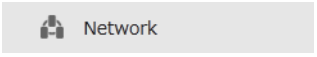
User Authentication with an External SMB Server

LinkStations on your network can be linked to an authentication server for centralized management of user accounts and passwords. The authentication server should be another TeraStation or LinkStation. Other external SMB authentication servers are not supported.

Notes:

- Disable SMB2 before using external authentication.
- Access restrictions for local users and groups will still apply to shared folders if an external SMB server is used for authentication.
- The procedure below contains methods to automatically register external users. You can also manually add external users by converting them from local users. Refer to the “Converting Local Users into External Users” section above for more details on converting local users.

1 In Advanced Settings, click *Network*.



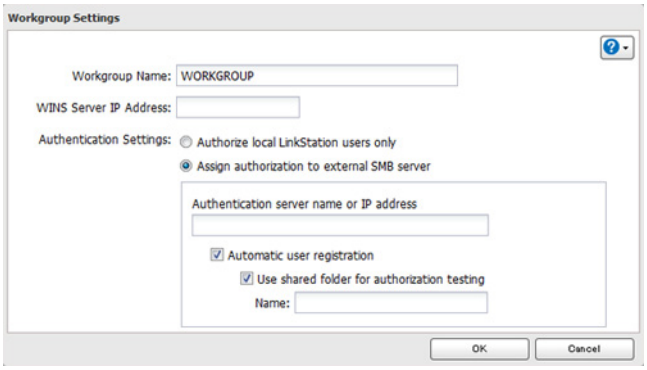
2 Click to the right of "Workgroup/Domain".

3 Click *Edit*.

4 Select "Workgroup" and click *Next*.

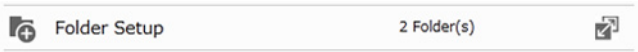
5 If a prompt appears, click *Yes*.

6 Enter a workgroup name. Select "Assign authorization to external SMB server" and enter the authentication server's IP address (recommended) or name. Check "Automatic user registration" and "Use shared folder for authorization testing". Enter the shared folder name for authorization testing and click *OK*.

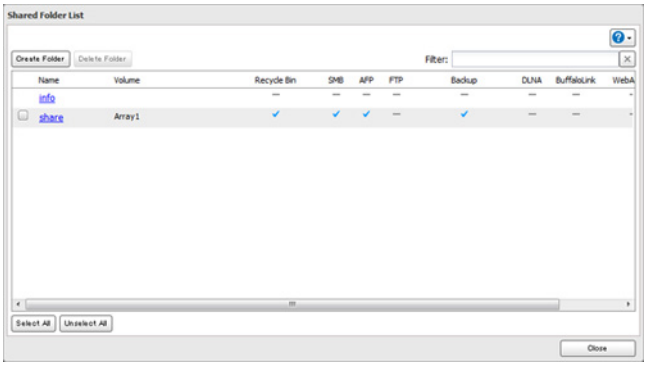


7 A shared folder for authentication has been created on the LinkStation. Users registered to the specified authentication server are automatically registered as users on the LinkStation when they open the shared folder for authentication. You can also register users directly. Connect to the authentication folder via SMB, not FTP or AFP.

8 Click to the right of "Folder Setup".



9 Click a shared folder to set access restrictions on.



10 Click *Edit*.

11 Enable "Access Restrictions".

12 Click on the *External Users* tab and select the level of access for each external user.

: Read and write access allowed : Read access allowed : Access prohibited

13 Click *OK*.

Notes:

- Users that are automatically registered belong to the "hdusers" group. They can be added to other groups from within groups settings. Added users will be listed in "Users" - "External Users". To delete a user that was registered automatically, select that user and click *Delete External User*.
- If both read-only and read & write permissions are given to a user, the user will have read-only access. The most restrictive attribute will apply.
- Use OS X 10.5 or later with external authentication. Earlier versions of OS X aren't supported.

- To access access-limited shared folders from OS X 10.7, use AFP instead of SMB, under "LAN Protocol Support, check "AFP (Mac)" on the destination folders to use AFP.
- If access restrictions are set for users and groups from the authentication server, guest and anonymous connections will not be possible with AFP and FTP connections.
- If using a Windows PC for external authentication, the default Windows SMB security settings may need to be changed. An easy way to do this is to run the File Sharing Security Level Change Tool, available from this product's download page on www.buffalotech.com. This utility will let you easily change or restore your Windows security settings to work with external authentication.

Converting Local Users into External Users

If using an external SMB server for authentication, you may convert any local users into external users. This way, the LinkStation will have a user list that matches the users in the external SMB server, and access restrictions for this LinkStation's shared folders may be assigned to the converted "external" users.

Follow the steps below to convert a local user into an external user. If a local user is converted, their user information (including passwords) will be removed from the LinkStation. External users cannot be reverted to local users.

Note: External authentication should be enabled before local users can be converted. For more information on external authentication, refer to the "User Authentication with an External SMB Server" section.

1 In Advanced Settings, click *File Sharing*.

2 Click to the right of "Users".

3 In the user list screen, check any users to be converted to an external user, then click *Convert to External User*.

4 Click *OK*.

5 Enter the confirmation number and click *OK*.

Converted users are displayed under the "External Users" tab. You can then configure access restrictions for external users.

Chapter 4 Managing Storage

RAID Arrays

The default RAID mode is RAID 0 for LS420D and RAID 1 for LS420DS.

Notes:

- If you change the RAID mode, all data on the array is deleted. This is true for every procedure in this chapter. Always back up any important data before performing actions that affect your RAID.
- After the RAID mode is changed (except when creating a RAID 0 array or JBOD), the LinkStation performs a RAID check that will take about 10 hours per TB. File transfers are slower during this period. While the I17 message is displayed in NAS Navigator2, do not turn off the LinkStation. If you do, the RAID check will start over.

RAID 1

Combines 2 drives into a mirrored array. The available space in the array is the capacity of a single drive. Identical data is written to each drive. If a drive is damaged, data can be recovered by replacing the damaged drive. As long as one drive in the array remains undamaged, all data in the array can be recovered.

RAID 0

Combines 2 or more hard drives into a single array. The usable disk space is the total space of all drives used. This simple RAID mode offers faster performance than RAID modes that include parity. If a single drive in the array fails, then all data in the array is lost.

JBOD

This mode uses the hard drives inside the LinkStation as individual drives. The disk space you can use is the total capacity of all drives in the LinkStation. If any drive is damaged, then the data on that drive is lost.

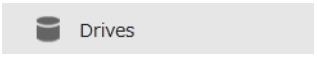
Working with RAID Arrays

To change RAID settings, navigate to *Drives* - *RAID* in Advanced Settings.

Using JBOD

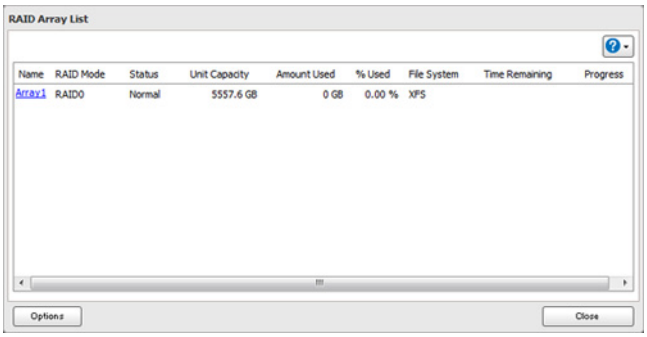
With JBOD, each hard drive in the LinkStation is addressed separately. To put drives from an array into JBOD mode, follow the steps below.

1 In Advanced Settings, click *Drives*.



2 Click to the right of "RAID".

3 Click the array to delete.


RAID Array List
Name RAID Mode Status Unit Capacity Amount Used % Used File System Time Remaining Progress
Array1 RAID0 Normal 5557.6 GB 0 GB 0.00 % XFS
Options
Close

4 Click *Delete RAID Array*.

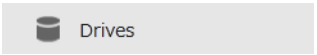
5 The "Confirm Operation" screen will open. Enter the confirmation number, then click *OK*.

Once JBOD is configured, create shared folders on each drive to use them.

Changing RAID Mode

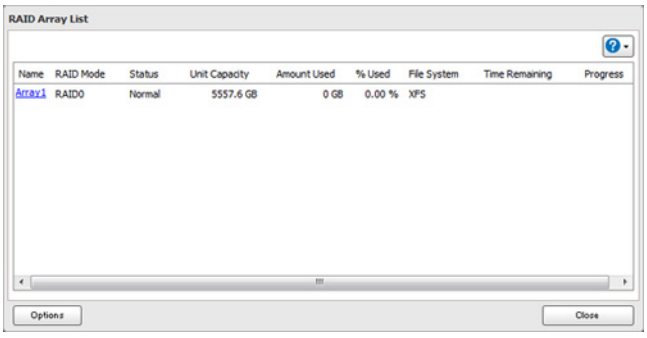
To change the RAID mode, first put the drives in JBOD.

1 In Advanced Settings, click *Drives*.



2 Click to the right of "RAID".

3 Click the array to delete. If the "RAID Mode" is blank, the array is already in JBOD. Proceed to step 7.


RAID Array List
Name RAID Mode Status Unit Capacity Amount Used % Used File System Time Remaining Progress
Array1 RAID0 Normal 5557.6 GB 0 GB 0.00 % XFS
Options
Close

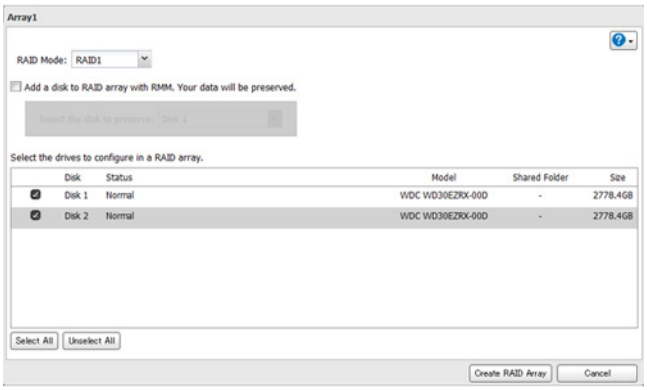
4 Click *Delete RAID Array*.

5 The "Confirm Operation" screen will open. Enter the confirmation number, then click *OK*.

6 Click *OK*.

7 Choose a RAID array.

8 Select a RAID mode and the drives to be used, then click *Create RAID Array*.


Array1
RAID Mode: RAID1
Add a disk to RAID array with RMM. Your data will be preserved.
Select the drives to configure in a RAID array.
Disk Status Model Shared Folder Size
Disk 1 Normal WDC WD30EZRX-00D - 2778.4GB
Disk 2 Normal WDC WD30EZRX-00D - 2778.4GB
Select All
Unselect All
Create RAID Array
Cancel

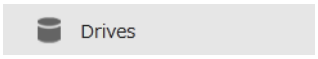
9 Step through the wizard to create the array.

Note: After changing the RAID mode, create a shared folder.

RMM (RAID Mode Manager)

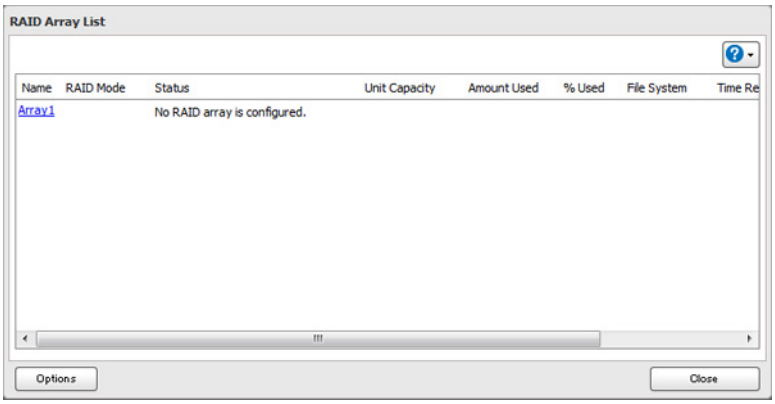
With RMM, you can create or expand a RAID array without erasing the data on the drives.

1 In Advanced Settings, click *Drives*.



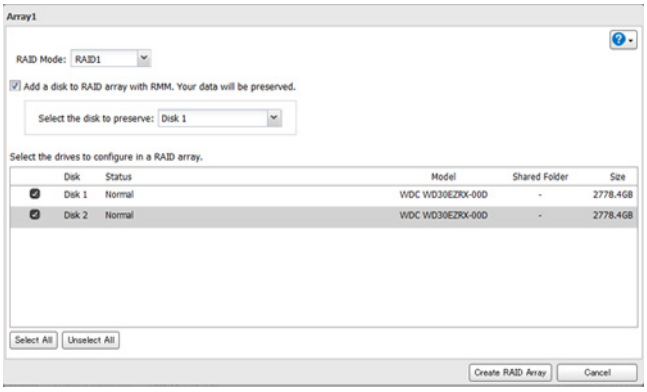
2 Click to the right of "RAID".

3 Choose a RAID array.


RAID Array List
Name RAID Mode Status Unit Capacity Amount Used % Used File System Time Re
Array1
No RAID array is configured.
Options
Close

4 Set the RAID mode to "RAID 1".

5 Check "Add a disk to RAID array with RMM. Your data will be preserved.".



6 Select the drive whose data will be saved from the drop-down menu.

7 Select the drive to add to the RAID array.

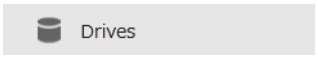
8 Click *Create RAID Array*.

9 The "Confirm Operation" screen will open. Enter the confirmation number, then click *OK*.

RAID Scanning

A RAID scan checks your RAID array for bad sectors and if it finds any it automatically repairs them. RAID 1 arrays are supported. For best result, run RAID scans regularly.

1 In Advanced Settings, click *Drives*.



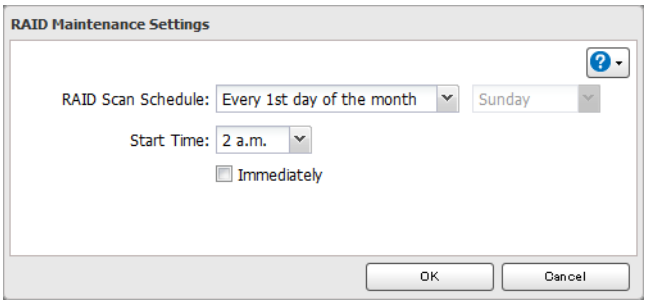
2 Move the RAID scanning switch to the

position to enable RAID scanning.

3 Click to the right of "RAID Scanning".

4 Click *Edit*.

5 Select the schedule for running RAID maintenance, then click *OK*.



Notes:

- Check "Immediately" to run a RAID scan immediately.
- To stop a RAID scan, click *Cancel RAID Scan*.
- Even if the RAID scan finishes, the I17 message may appear in NAS Navigator2 and the power LED may blink amber. To remove the I17 message from NAS Navigator2 and stop the power LED from blinking, restart your LinkStation.

Adding an External Hard Drive

Connect an External Drive

Your LinkStation includes a USB port and you can connect an external drive to this port. It will appear as a shared folder on the LinkStation. Formatted drives are detected automatically. Unformatted drives should be formatted in Settings.

After a USB drive is recognized, Windows adds "usbdisk X" under the LinkStation in "Network", where "X" is the USB port where the hard drive is connected.

Notes:

- Hubs are not supported. Connect a single USB drive to the USB port.
- Backup data from Mac OS may include characters that cannot be written to FAT16 or FAT32 drives such as ".DS_Store". For best results, reformat the drive before using it as a backup target.
- You can use the USB device server to connect a USB hub and up to 15 USB devices. However, with USB device server, the USB devices cannot be used for creating shared folders or act as LinkStation backup destinations.

Compatibility

The following devices are supported by the LinkStation:

- USB storage devices
- Card readers (except for card readers that can recognize two or more memory cards)
- Digital cameras
- USB-connected UPSs
- USB printers

Buffalo external USB drives are recommended.

These devices are not supported:

- DUB and DIU series drives
- Hubs, mice, and keyboards

Connect only one device to a USB port. Some external drives with automatic power-on don't turn on automatically when connected to the LinkStation. Use their manual switch to turn them on. Be sure to connect only one bus-powered drive at a time. If there is insufficient bus power for your USB drive, connect its AC adapter. Note that only the first partition of a connected USB hard drive is mounted. Additional partitions are not recognized.

Dismounting Drives

If the LinkStation is powered on, dismount external drives before unplugging them. You may dismount external drives with the function button, or any drives from Settings. If the LinkStation is off, then all drives are already dismounted and may be unplugged safely.

Notes:

- Do not dismount or disconnect an external drive while any drive is being formatted, accessed, or checked for errors, or while a RAID array is being created or deleted.
- If you unplug your external drives without dismounting them, Settings may still show "usbdisk" in *File Sharing - Folder Setup*. Reboot your LinkStation to clear it.

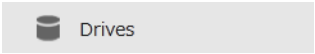
Dismounting with the Function Button

If the LinkStation is on, hold down the function button for 3 seconds. The white LED will go out as all attached USB drives are dismounted. You may now unplug them safely.

Note: Dismounting drives will also restart the services for FTP, AFP, SMB, the print server, BitTorrent, WebAccess, DLNA, and the iTunes server. Don't do this while files are being copied or accessed.

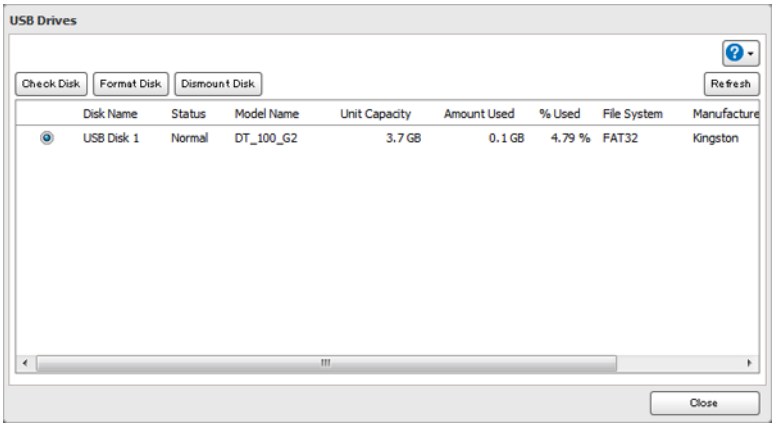
Dismounting from Settings

1 In Advanced Settings, click *Drives*.

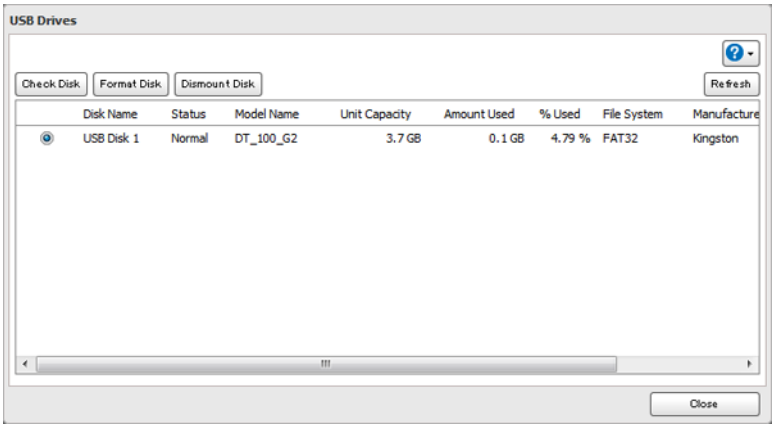


2 Click to the right of "USB Drives".

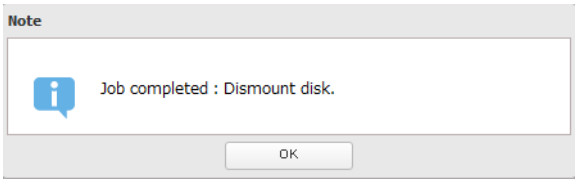
3 Select the drive to dismount and click *Dismount Disk*.



4 The "Confirm Operation" screen will open. Enter the confirmation number and click *OK*.



5 When the following message is displayed, it is safe to unplug the drive.

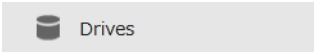


Note: To remount the drive, unplug it and then plug it back again.

Checking Drives

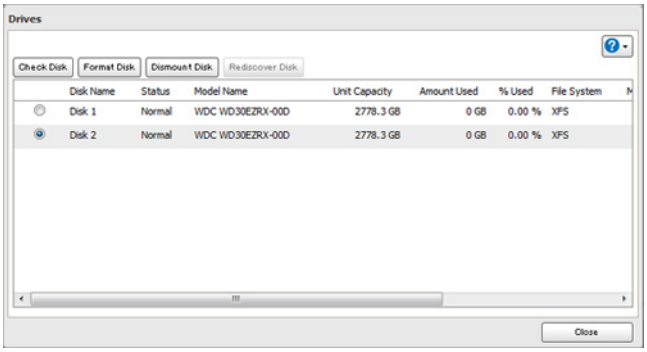
A disk check tests the data on a drive in the LinkStation or connected via USB for integrity. Errors are fixed automatically. With large drives, a disk check may run for many hours. Shared folders cannot be accessed during a disk check. Do not turn off the LinkStation until the disk check is finished. Follow the procedure below to run a disk check.

1 In Advanced Settings, click *Drives*.

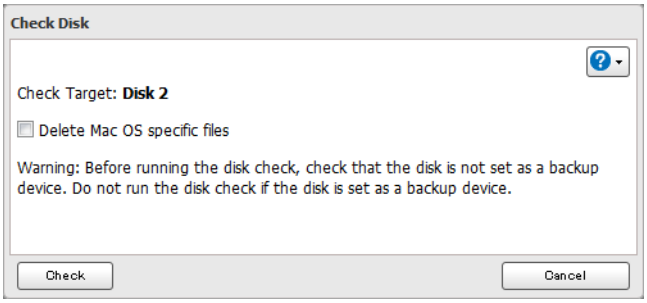


2 Click *Drives* to check an internal drive or *USB Drives* to check an external drive.

3 Select the drive to test and click *Check Disk*.



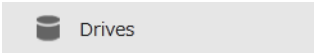
4 Click *Check*. You have the option of deleting information files from Mac OS during the check if desired.


Check Disk
Check Target: Disk 2
Delete Mac OS specific files
Warning: Before running the disk check, check that the disk is not set as a backup device. Do not run the disk check if the disk is set as a backup device.
Check
Cancel

Formatting Drives

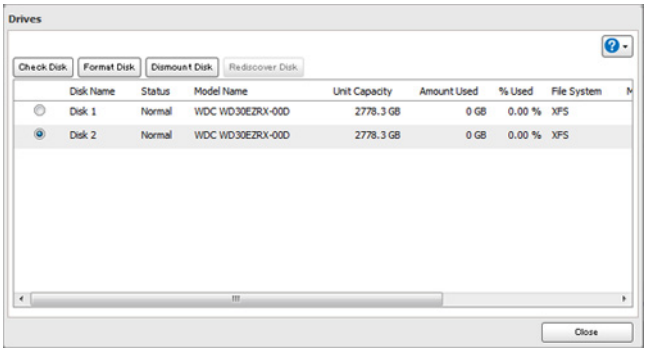
Note: Under some circumstances, data deleted when a drive is formatted can be recovered. To ensure that data is "gone forever", a format might not be sufficient. See the "Erase Data on the LinkStation Completely" section below.

1 In Advanced Settings, click *Drives*.

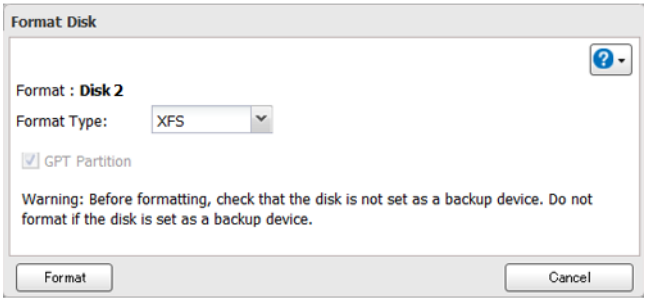


2 Click *Drives* to format an internal drive or *USB Drives* to format an external drive.

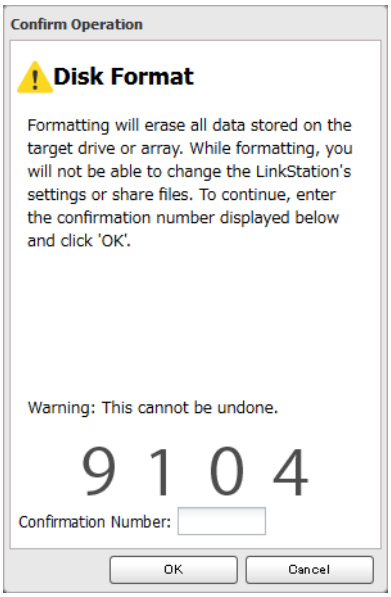
3 Select the drive to format, then click *Format Disk*.



4 Select a format type and click *Format*.


Format Disk
Format : Disk 2
Format Type:
XFS
GPT Partition
Warning: Before formatting, check that the disk is not set as a backup device. Do not format if the disk is set as a backup device.
Format
Cancel

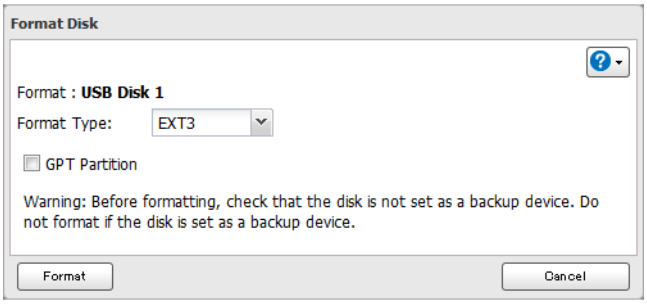
5 The "Confirm Operation" screen will open. Enter the confirmation number and click *OK*.


Confirm Operation
Disk Format
Formatting will erase all data stored on the target drive or array. While formatting, you will not be able to change the LinkStation's settings or share files. To continue, enter the confirmation number displayed below and click 'OK'.
Warning: This cannot be undone.
9 1 0 4
Confirmation Number:
OK
Cancel

6 Depending on the size of your drive, the format may take several minutes to several hours to complete. The power LED will flash during the format. Shared folders cannot be accessed during a format. Do not turn off the LinkStation until the disk format is finished.

Formatting External Drives

Formatted drives are detected automatically. If a drive is not formatted, format it from Settings. Refer to "Formatting Drives" for the procedure.


Format Disk
Format : USB Disk 1
Format Type:
EXT3
GPT Partition
Warning: Before formatting, check that the disk is not set as a backup device. Do not format if the disk is set as a backup device.
Format
Cancel

Notes:

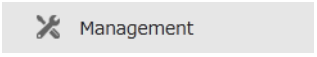
- Do not turn off or disconnect power to the LinkStation while formatting a hard drive.
- For drives of 2.2 TB or larger, make sure that the "GPT Partition" checkbox is selected. If you accidentally format a larger drive without GPT, disconnect and then reconnect it before reformatting with GPT.
- The following format types are supported to format from Settings: FAT32 (recommended for connecting to computers), EXT3 (recommended for sharing with other LinkStations), and XFS (recommended for adding additional external storage to a LinkStation).

Erase Data on the LinkStation Completely

Under some circumstances, data from formatted drives can be recovered. The disk erasure process in this section does a much more thorough job of erasing data. This procedure is recommended for removing all data from a drive in a way that makes it nearly impossible to recover with current tools. All data on the drives is completely erased. The LinkStation will then be in the following state:

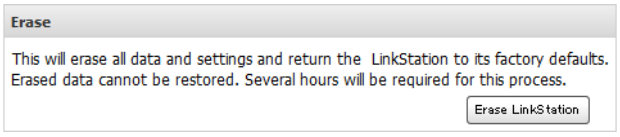
- All drives in JBOD
- An empty shared folder on each drive
- All settings returned to their default values
- All logs deleted

1 In Advanced Settings, click *Management*.

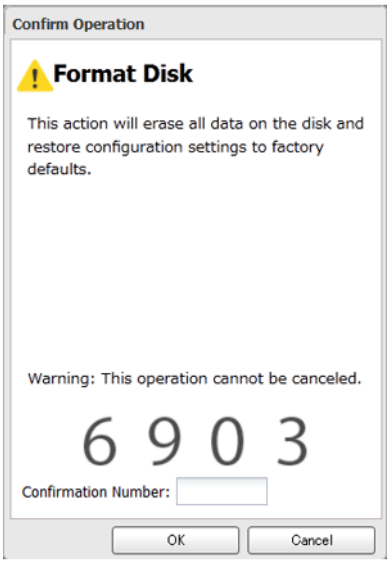


2 Click to the right of "Restore/Erase".

3 Click *Erase LinkStation*.


Erase
This will erase all data and settings and return the LinkStation to its factory defaults.
Erased data cannot be restored. Several hours will be required for this process.
Erase LinkStation

4 The "Confirm Operation" screen will open. Enter the confirmation number, then click *OK*.


Confirm Operation
Format Disk
This action will erase all data on the disk and restore configuration settings to factory defaults.
Warning: This operation cannot be canceled.
6 9 0 3
Confirmation Number:
OK
Cancel

5 All data on the LinkStation will be permanently erased.

Disk Quotas

Disk quota will limit drive space for each user or group. You can also configure alert space which will send a notification email when the drive space exceeded the alert space. To spend a notification, configure email notification referring to chapter 8, "Email Notification" section.

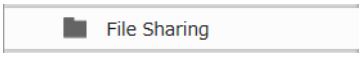
Notes:

- When using quotas, disable the recycle bin or empty the trash folder often. The limited space includes the space used for trash.
- Quotas apply per drive or per array. If a quota is set to 1 GB, each array or drive can use a maximum of 1 GB.
- Quotas cannot be set for external drives connected to the LinkStation.
- If both user and group quotas are configured for a user, the most restrictive quota will always apply.

Quotas for Users

Follow this procedure to limit the shared folder disk space available for a user.

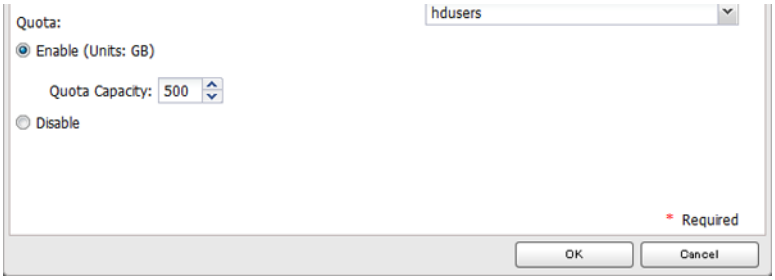
1 In Advanced Settings, click *File Sharing*.



2 Click ⧉ to the right of "Users".

3 Select the user whose space will be limited.

4 Enable quotas, choose the maximum space the user will be allowed to use, and click *OK*.



Note: If you change the primary group, restart the LinkStation to apply the quota settings.

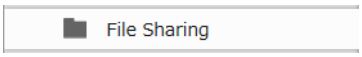
5 Click *OK*.

6 Click the icon and select *Restart* to apply the quota settings.

Quotas for Groups

Follow the procedure below to limit the space for shared folders that each group can use.

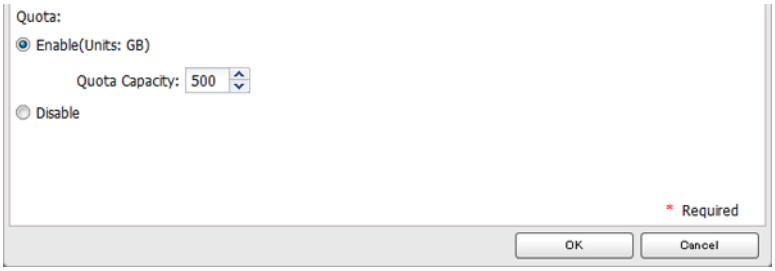
1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Groups".

3 Select the group whose space will be limited.

4 Enable quotas, choose the maximum space the group is allowed, and click *OK*.



5 Click *OK*.

6 In Advanced Settings, click to the right of "Users".

7 Select the user who will inherit the group quota settings.

8 Change the user's primary group to the group with the quota, then click *OK*.

9 Click *OK*.

10 Click the icon and select *Restart* to apply the quota settings.

Hard Drive Replacement

If a drive fails, NAS Navigator2 and Settings will show an error message.

Notes:

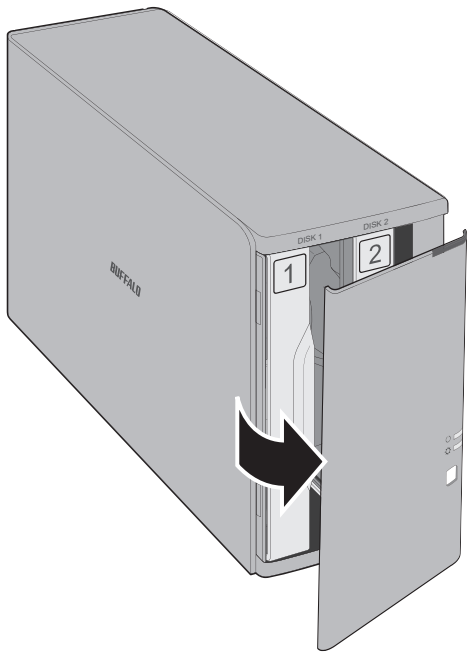
- Do not replace a running drive while the LinkStation is turned on. Power down the LinkStation before changing the drive. While the LinkStation is running, never unplug or remove drives without dismounting them first.
- The replacement drive should be a OP-HDBST series drive, available from Buffalo. Using a different drive might cause your LinkStation to malfunction.
- Use a Buffalo OP-HDBST series drive of the same size or larger for the replacement drive. If a larger drive is used, the extra space will not be usable in a mirrored RAID array.
- To avoid damaging the LinkStation with static electricity, ground yourself by touching something made of metal before handling any sensitive electronic parts.
- After a drive is replaced, it will take about 30 minutes before normal file reading and writing are restored. Settings may not be accessible during this period.
- Do not change the order of the hard drives in the LinkStation. For example, pulling out drive 1 and replacing it with drive 2 may cause data to be corrupted or lost.
- If a new drive is not recognized after installing it, click *Rediscover Disk* in Settings.

Hard Drive Replacement Examples

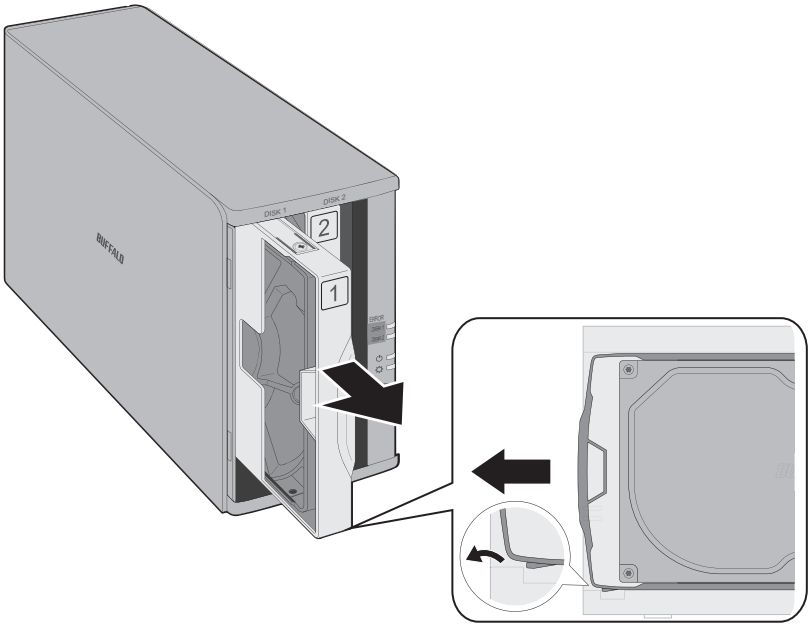
Before turning off the LinkStation, determine which hard drive has failed. The failed drive's status LED will be glowing red.

1 Turn the LinkStation off and remove all cables.

2 Squeeze the left side of the front panel and pull the panel off.



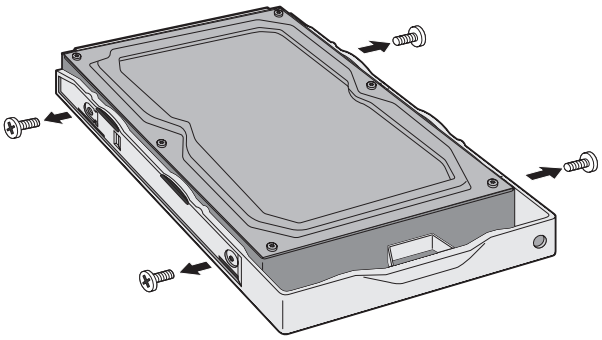
3 Push the failed drive's cartridge up and remove it from the LinkStation.



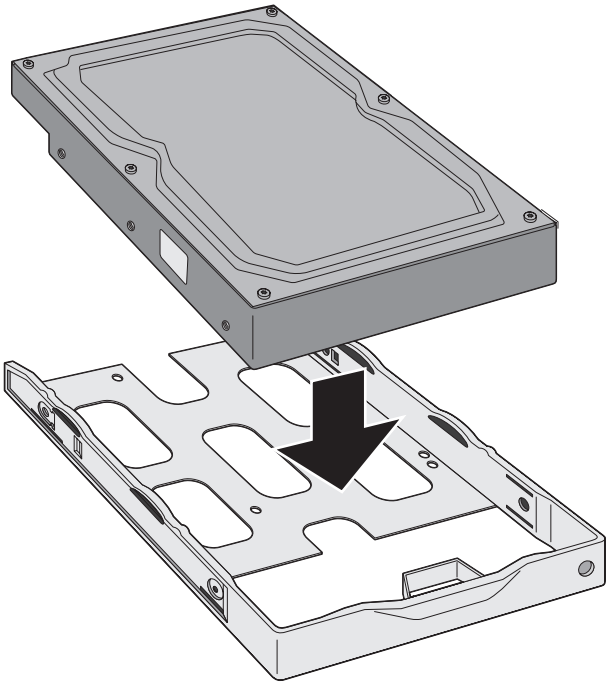
Notes:

- Do not press hard on the top of the LinkStation.
- Pull the drive straight out the front of the chassis.

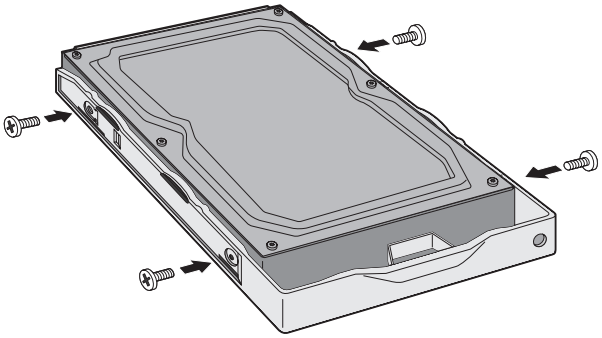
4 Remove the drive from the cartridge.



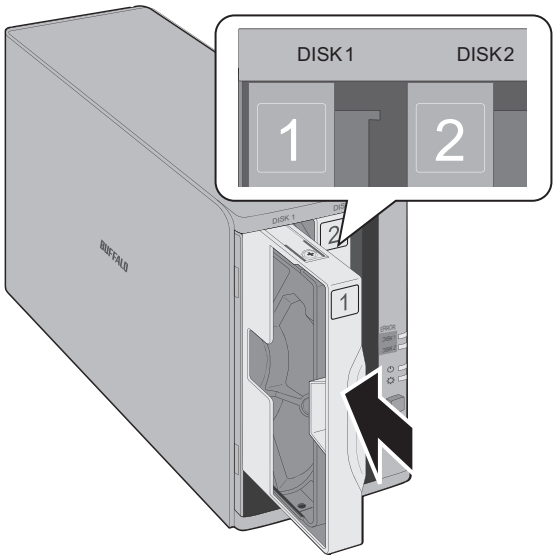
5 Install a new Buffalo OP-HDBST series drive in the cartridge.



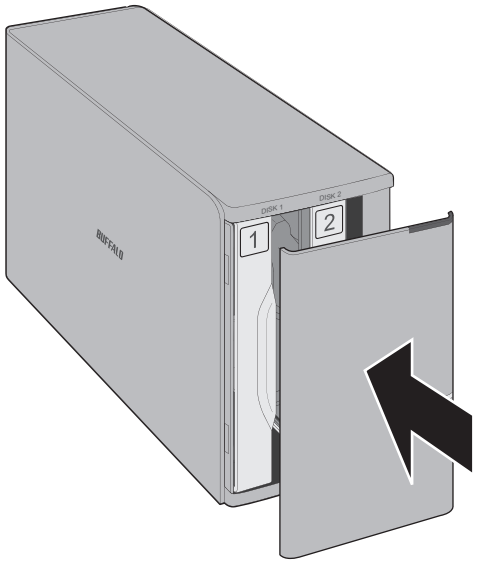
6 Replace the four screws.



7 Insert the new drive in the empty slot.



8 Close the front panel.



9 Connect all cables, then turn on the LinkStation.

10

For RAID 0

Navigate to *Drives - RAID* in Advanced Settings. Select the array with the error, then click *Delete RAID Array*.

Navigate to *Drives - Drives*. Choose the new drive (the unformatted one) and format the drive. After formatting the drive, change the RAID mode.

For RAID 1

Navigate to *Drives - RAID* in Advanced Settings. Select the array with the error, then click *Recover RAID Array*.

Follow the procedure on the screen to complete the hard drive replacement.

Note: While the RAID array is rebuilding, the LinkStation's power LED may turn off for a while. The unit is still running however. To check the progress of the rebuild, log in to Settings.

For JBOD

Navigate to *Drives - Drives* in Advanced Settings. Format the new drive and create a shared folder before use.

Chapter 5 Remote Access

WebAccess

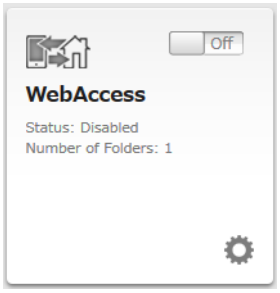
WebAccess is a program for accessing the files in the shared folder of your LinkStation from your computer or mobile device through the Internet. **Be careful when configuring WebAccess. Certain settings can make the files in the shared folder available to anyone on the Internet, without any access restrictions.**

Note: Use compatibility mode to use WebAccess with Windows 8.1 or Windows 8.

Configuring from a Computer

Configuration from Easy Admin

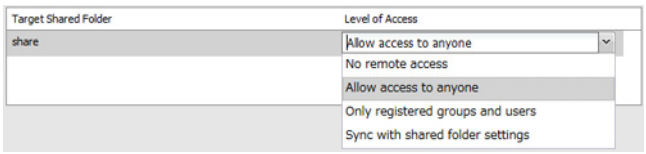
1 Click *WebAccess* in Easy Admin.



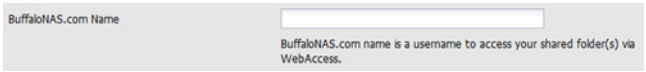
2 Move the WebAccess switch to the On position to enable WebAccess.

WebAccess
On
WebAccess allows you to create a secure personal cloud for easy remote access and file sharing with anyone, anywhere over the Internet while your data remains securely stored in one place on your home network.

3 Select the level of access for each shared folder from the drop-down list.



4 Enter a BuffaloNAS.com name for your BuffaloNAS account.



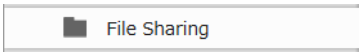
Note: The BuffaloNAS.com name may contain from 3 to 20 alphanumeric characters, underscores (_), and hyphens (-). The BuffaloNAS.com name is case-sensitive.

5 Click *Apply*.

6 Continue with the procedure at http://buffalonas.com/manual/setup/en/.

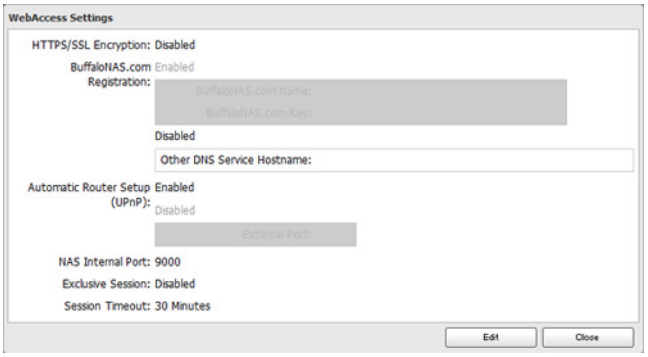
Configuration from Advanced Settings

1 In Advanced Settings, click *File Sharing*.

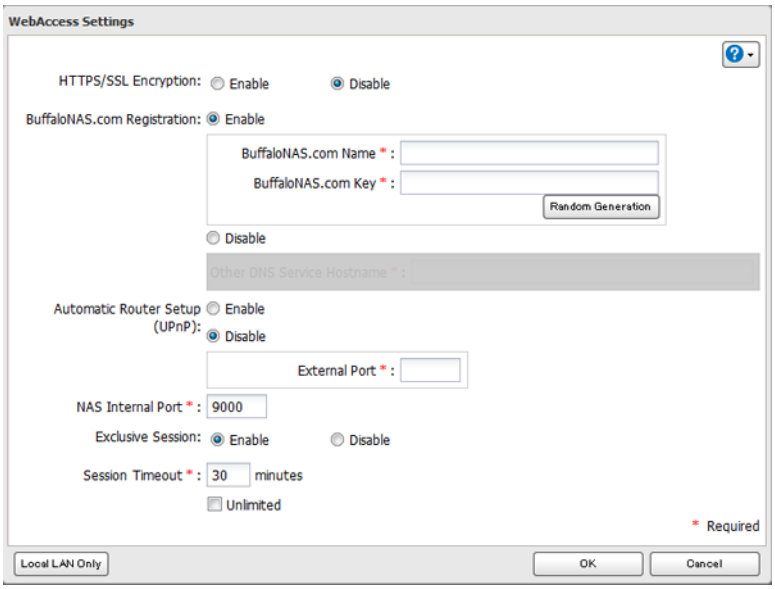


2 Click to the right of "WebAccess".

3 Click *Edit*.



4 Configure the desired settings, then click *OK*.



- To use SSL encryption for more secure data transfers, enable "HTTPS/SSL Encryption".
- Some WebAccess applications may not support HTTPS/SSL encryption. Disable it if this is an issue. For more details, refer to the WebAccess Help Guide.
- You may use the default BuffaloNAS.com registration, or disable it to use a different DNS server.
- Choose a "BuffaloNAS.com name" and "BuffaloNAS.com key" for your WebAccess account. Names and keys may use 3 to 20 alphanumeric characters, underscores (_), and hyphens (-).
- If "Exclusive Session" is enabled, users cannot log multiple computers in to WebAccess. Only the last login will be active.
- Enter a time in minutes (1 to 120 or "Unlimited") before inactive users are logged out of WebAccess.

5 Click *OK*.

6 Move the switch to the

position to enable WebAccess.

7 Click to the right of "Folder Setup".

8 Select a shared folder to publish.

Notes:

- For best results, create a new dedicated share for WebAccess.
- When accessing shared folders through WebAccess from a remote location, the username and password may be required for certain operations. For best results, create a user account with permissions on the WebAccess share before using WebAccess.

9 Click *Edit*.

10 Under "LAN Protocol Support", check "WebAccess" and click *OK*.

Notes:

- The following levels of security are available:
  "Allow Anonymous" - Anyone can access (view) shared folders.
  "Allow All Groups and Users" - All groups and users registered on the LinkStation or TeraStation can use WebAccess.
  "Use Inherited Folder Permissions" - Users and groups have the same access permissions with WebAccess that they do locally. If access restrictions are not set for the shared folder, then this option will not be shown.
- When a user or group can access a folder through WebAccess depends on a combination of WebAccess settings and the shared folder's settings.

Folder Setup	WebAccess Public Mode	Allow Anonymous		Allow All Groups and Users		Use Inherited Folder Permissions	
	Folder Attribute	Read & Write	Read Only	Read & Write	Read Only	Read & Write	Read Only
WebAccess Account	Not logged in	R	R	-	-	-	-
	User with read & write access	R/W	R	R/W	R	R/W	R
	User with read-only access	R/W	R	R/W	R	R	R
	Group with read & write access	R/W	R	R/W	R	R/W	R
	Group with read-only access	R/W	R	R/W	R	R	R
	Other users	R/W	R	R/W	R	-	-

R: Read only, R/W: Read and write, -: No access

11 Continue with the procedure at http://buffalonas.com/manual/setup/en/.

Note: If you change your BuffaloNAS.com name after WebAccess has been configured, WebAccess may no longer work properly. If this happens, disable and then re-enable WebAccess.

Use with iPhone, iPad, iPod touch

Download the "WebAccess" application from the App Store.
Instructions: http://buffalonas.com/manual/i/en/

Use with Android

Download the "WebAccess" application from Google Play.

Instructions: http://buffalonas.com/manual/a/en/

Use with Windows Phone

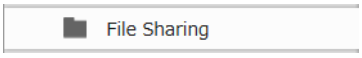
Configure your LinkStation from the computer first, then download the "WebAccess" application from the Windows Phone Store.
Instructions: http://buffalonas.com/manual/setup/en/

FTP

By default, the LinkStation's shares are only accessible by users connected to the same network or router as the LinkStation. The optional FTP server allows users outside the local network to access the LinkStation.

Note: FTP is intended for users who already have FTP client software and have experience with it.

1. In Advanced Settings, click *File Sharing*.



2. Move the FTP switch to the

position to enable FTP.

3. Click to the right of "Folder Setup".

4. Click to the right of "Folder Setup".

5. Choose a folder to enable remote FTP access on.

6. Click *Edit*.

7. Select read-only or read & write for the shared folder's attribute; under "LAN Protocol Support", check "FTP" and click *OK*.

Accessing the LinkStation with an FTP client

- To access the LinkStation via FTP, configure your FTP client software with the following settings:
  Hostname: IP address of the LinkStation
  Username: The LinkStation's username
  Password: The LinkStation's password
  Port: 21
- Shared folders connected by FTP are available from the "/mnt" directory. The default locations are:
  For RAID 0 or RAID 1:
  /mnt/array1/share
  /mnt/usbdisk1
  /mnt/usbdisk2
  For JBOD:
  /mnt/disk1/share
  /mnt/disk2/share2
  /mnt/disk3/share3
  /mnt/disk4/share4
  /mnt/usbdisk1
  /mnt/usbdisk2

Accessing the LinkStation with an anonymous user*

- To allow anonymous access to your FTP share, disable access restrictions.
- To access the LinkStation via anonymous FTP, configure your FTP client software with the following settings:
  Hostname: IP address of the LinkStation
  Username: Anonymous
  Password: Any character string
  Port: 21

If the LinkStation joins a domain, anonymous users cannot access it.

Notes:

- Don't use FTP to share files and folders with multi-byte characters in their names with a Mac. Use an AFP or SMB connection instead.
- If a file was created or copied by AFP, you may not be able to delete it using an FTP connection. If this occurs, use an SMB or AFP connection instead to delete the file.
- For FTP connections, make sure that the total filename including directory path is 250 single-byte characters or less.

Chapter 6 Backup

Back Up from the LinkStation

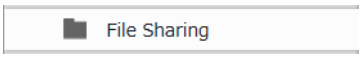
You can back up LinkStation folders to:

- A different folder on the LinkStation
- Another LinkStation on the network
- Another TeraStation on the network

Preparing a Backup Destination

First, configure a folder as a backup destination.

1 In Advanced Settings, click *File Sharing*.



2 Click to the right of "Folder Setup".

3 Choose the folder to set as a backup destination.

4 Click *Edit*.

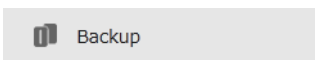
5 Under "LAN Protocol Support", check "Backup" and click *OK*.

Note: To configure a password, enter it in the "Remote Backup Password" field. Leave this field blank if you don't want a password. If the target or source device is configured with a backup password, the folder will not be listed as a target device in the folder list unless the configured password is entered.

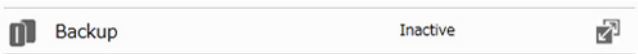
Backing up to a LinkStation or TeraStation on another network when connected by a VPN

You can back up to a LinkStation or TeraStation on another network as long as the two networks are connected by a VPN. Follow this procedure to enter the IP address or hostname of the target LinkStation or TeraStation.

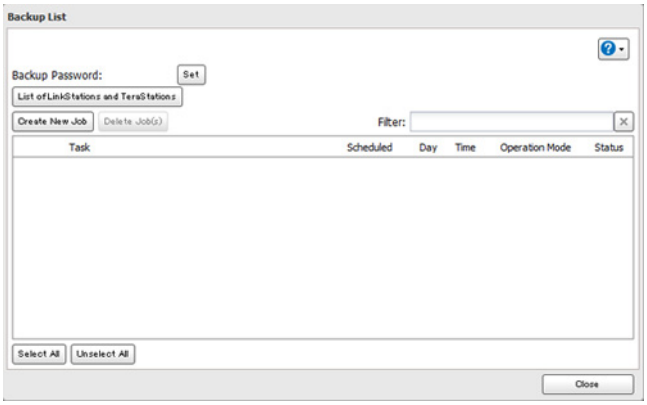
1 In Advanced Settings, click *Backup*.



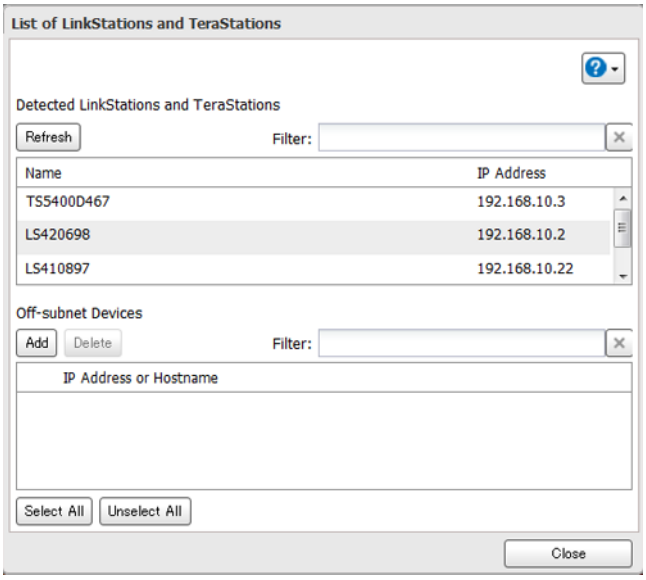
2 Click to the right of "Backup".



3 Click *List of LinkStations and TeraStations*.



4 Click *Add*, enter the IP address of the target LinkStation or TeraStation, and click *Close*.



If your setup meets the requirements below, you don't have to configure these settings.

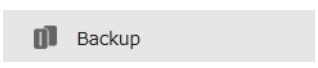
- The source and target LinkStations are on the same network.
- No backup password is set for the target LinkStation.
- No LinkStation from outside the subnet, or connected by a VPN, is used.

Notes:

- To back up data between LinkStations or TeraStations on a network using jumbo frames, make sure that both devices are configured to use identical (or similar) Ethernet frame sizes. If Ethernet frame sizes are significantly different, the backup job may not be properly performed. In such a case, select the default frame size (1500 bytes).
- You can also specify hostname by a fully qualified domain name (FQDN).

Configuring a Backup Job

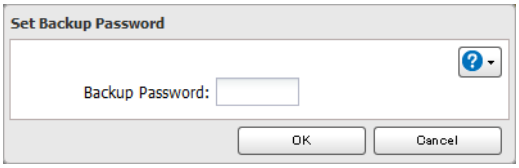
1 In Advanced Settings, click *Backup*.



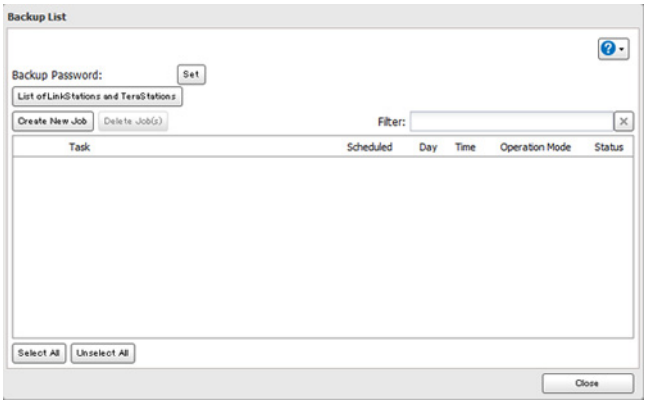
2 Click to the right of "Backup".

3 If you configured a backup password, click *Set* to the right of "Backup Password". If not, skip to step 5.

4 Enter the configured backup password and click *OK*.

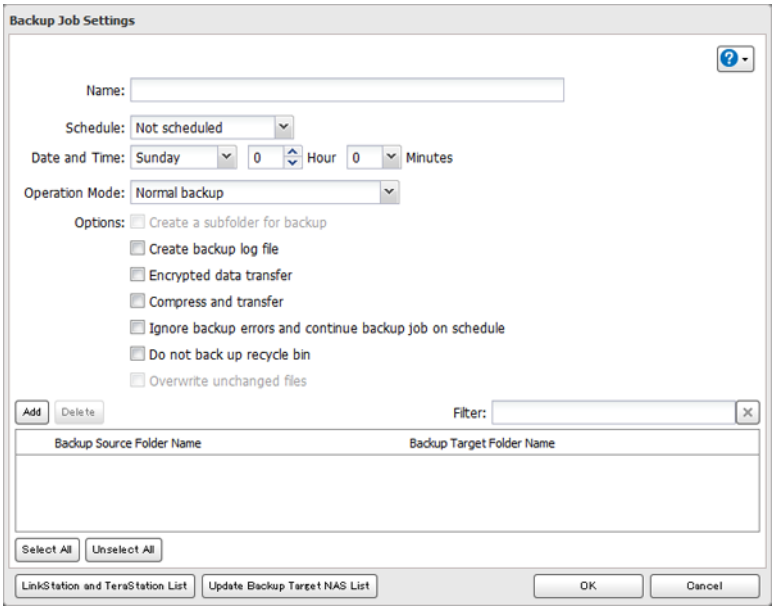


5 Click *Create New Job*.



Note: Up to 8 backup jobs can be configured.

6 Select backup settings such as date and time to run.



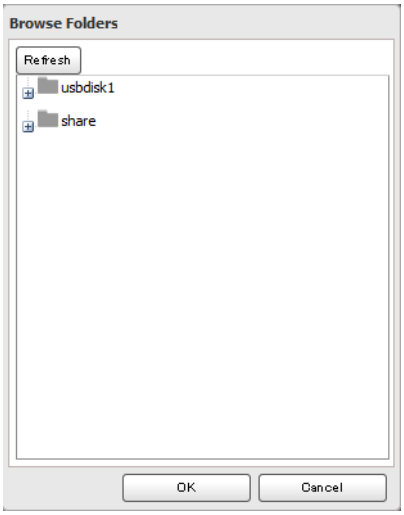
Note: The following types of backup jobs may be selected:

Type	Files Included
Normal backup	All files in the source will be backed up to the destination.
Overwrite (incremental)	The first time the backup job runs like a normal backup. In subsequent backups, files added to the source as well as files deleted from the source are kept in the backup folder.
Overwrite (differential)	The first backup job runs like a normal backup. As each additional backup job runs, files are added to and deleted from the backup folder. The backup destination folder is always the same size as the backup source folder.

7 Click *Add*.

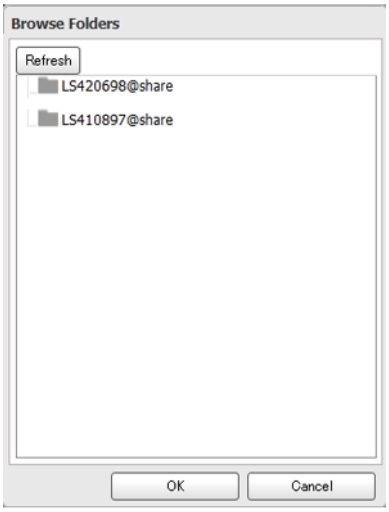
8 Click *Browse* under "Backup Source Folder Name".

9 Select the shared folder that will be the backup source, then click *OK*.



10 Click *Browse* under "Backup Target Folder Name".

11 Select the backup target and click *OK*.



12 Click *OK*. New backup jobs are now visible.

13 Click *Close*.

Backing Up Your Mac with Time Machine

Time Machine is a backup program included with OS X. To use your LinkStation as a backup destination for Time Machine, configure it as described below.

1 Make sure that AFP is enabled in Advanced Settings. The AFP switch should be in the On position.

2 Click to the right of "Folder Setup".

3 Choose a shared folder as your backup destination for Time Machine.

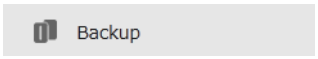
4 Click *Edit*.

5 Under "LAN Protocol Support", check "AFP (Mac)" and click *OK*.

6 Click *OK*.

7 Click *Close*.

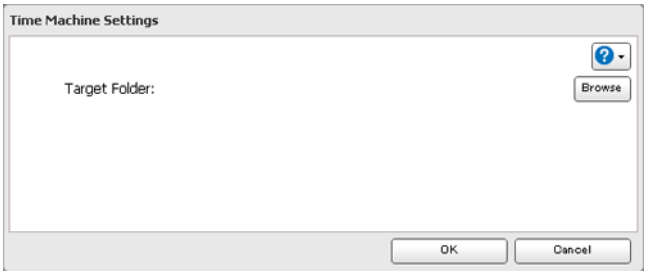
8 Click *Backup*.



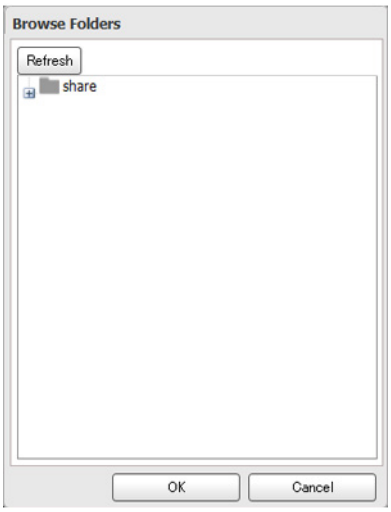
9 Click to the right of "Time Machine".

10 Click *Edit*.

11 Click *Browse*.



12 Select the shared folder that you set in the previous step, then click *OK*.



13 Click *OK*.

14 Click *OK*.

15 Move the Time Machine switch to the position to enable Time Machine.

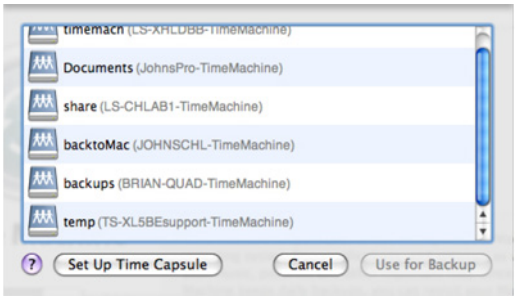
16 On the Mac, open *System Preferences*.

17 Click *Time Machine*.

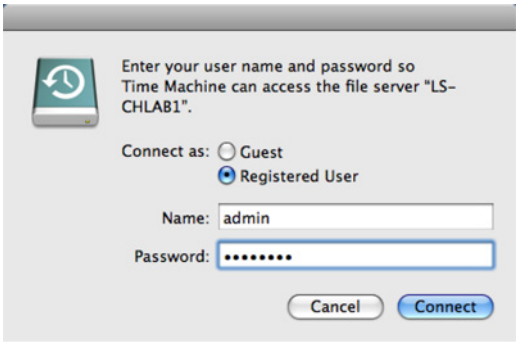
18 Click *Choose Backup Disk*.

Time Machine
Show All
Choose Backup Disk...
Time Machine
OFF
ON
Time Machine keeps copies of everything on your Mac, including system files, applications, and settings, as well as your music, pictures, and other important files. Since Time Machine keeps daily backups, you can revisit your Mac as it appeared in the past.
Show Time Machine status in the menu bar
Click the lock to prevent further changes.

19 Select the LinkStation, then click *Use for Backup*.



20 Enter a username and password with the rights to access the shared folder on the LinkStation, then click *Connect*.



Note: If access restrictions are not configured on the target share, log in with the administrator account. The default username and password for the administrator account are "admin" and "password". If access restrictions are configured, log in with an account with write privileges.

21 Time Machine will count down from 120 seconds and the backup will begin.

Copying from a USB Device

Use Direct Copy to copy from a USB device directly to the LinkStation.

Note: To use Direct Copy, connect only one USB device at a time.

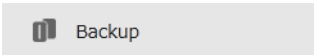
These devices are supported:

- USB mass storage devices
- Card readers (except for card readers that can recognize two or more memory cards)
- Digital cameras and other PTP devices
- UPS devices that are specifically indicated as compatible
- USB printers

These devices are not supported:

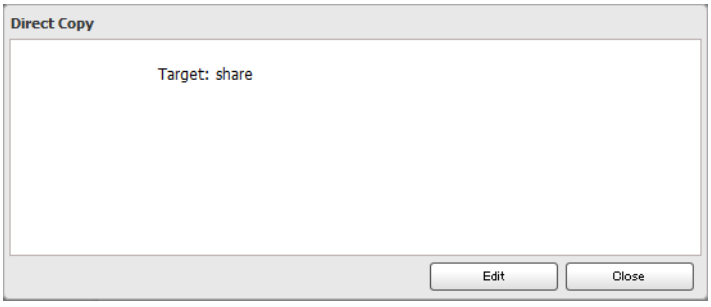
- USB hubs
- Mice
- Keyboards

1 In Advanced Settings, click *Backup*.



2 Move the Direct Copy switch to the position to enable Direct Copy.

To change the Direct Copy target folder, navigate to *Backup - Direct Copy - Edit*, select a new folder, and click *OK*.



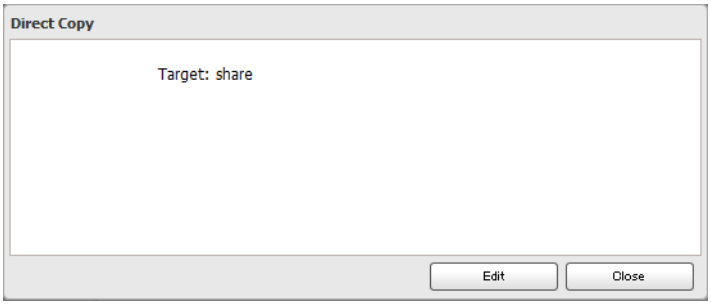
3 Connect the USB device. When it mounts (about 10 seconds), the function LED will light up.

Note: Devices that don't trigger the function LED to light up are not supported.

4 You now have 60 seconds to press the function button once. If you do, the function LED will flash as all the files on the USB device are copied to the Direct Copy folder of the LinkStation.

Notes:

- While the function LED is flashing, hold the function button down for 3 seconds to cancel Direct Copy.
- For digital cameras that are not in the USB mass storage class, all files from the digital camera are copied.
- To change the Direct Copy target folder, navigate to *Backup - Direct Copy - Edit*, select a new folder, and click *OK*.



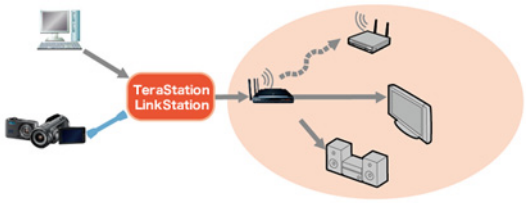
5 When the copy operation is finished, the access LED of the USB device will stop flashing. Hold down the function button for 8 seconds. The function LED will flash as all external drives are dismounted, which will take about 30 seconds. When the dismount is finished, the function LED will stop flashing and glow steadily. You now have 60 seconds to unplug any USB drives safely.

Chapter 7 Multimedia

DLNA

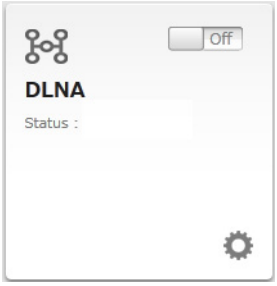
DLNA is a set of guidelines for sharing digital media. The LinkStation includes a DLNA server compliant with the DLNA guidelines. Movies, photos, and music saved on the LinkStation can be played back on DLNA-compatible TVs, stereo equipment, game consoles, and other devices on the local network.

Note: The LS420DS series LinkStation doesn't support this function. Some help text on Settings may reference DLNA but this is not correct. This behavior will be fixed in a future firmware update.

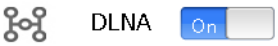


Configuration from Easy Admin

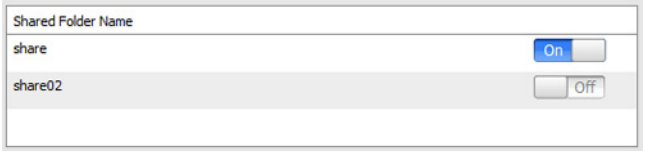
1 Click the ⚙ icon for "DLNA".



2 Move the DLNA switch to the On position to enable DLNA.



3 Move the switch for the folder you'll use for DLNA media to the On position as well.



4 Click *Apply*.

Configuration from Advanced Settings

1 In Advanced Settings, click *File Sharing*.

2 Click to the right of "Folder Setup".

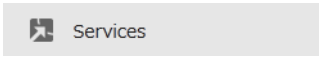
3 Select the folder that you want to share with media players and other DLNA-compatible devices.

4 Click *Edit*.

5 Under "LAN Protocol Support", check "DLNA" and click *OK*.

6 Click *Close*.

7 Click *Services*.

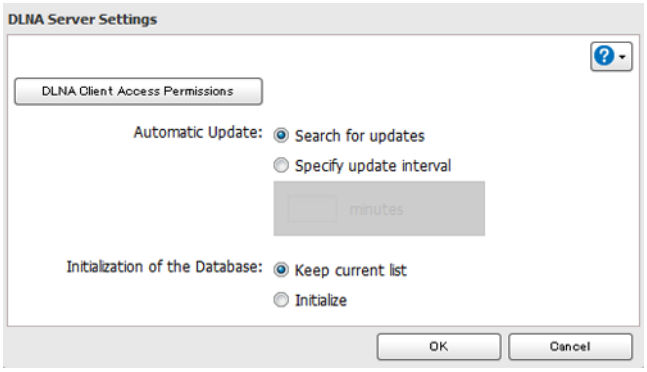


8 Move the DLNA Server switch to the On position to enable DLNA.

9 Click to the right of "DLNA Server".

10 Click *Edit*.

11 Select an interval for DLNA server database updates and click *OK*.



Playing Files

To play back content from a DLNA-compatible device:

1 Connect the DLNA-compatible device to the same network as the LinkStation and turn it on.

2 Select the LinkStation in the software of the DLNA-compatible device.

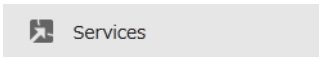
3 Select the content to be played back.

Note: For more information on playing files, see the DLNA-compatible devices' manuals.

Connected DLNA-compatible Devices

Follow the procedure below to view the DLNA-compatible devices connected to your LinkStation.

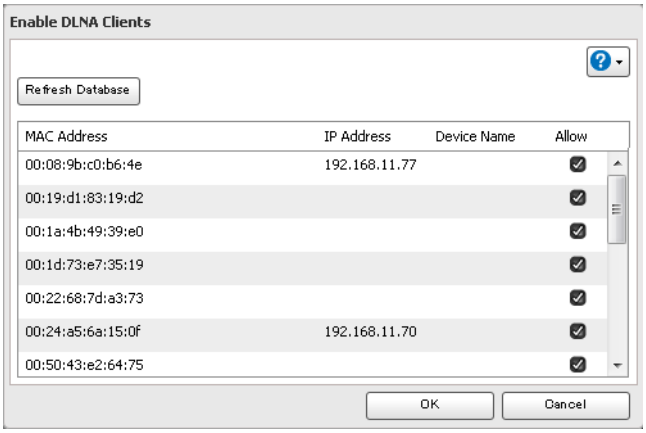
1 In Advanced Settings, click *Services*.



2 Click to the right of "DLNA Server".

3 Click *DLNA Client Access Permissions*.

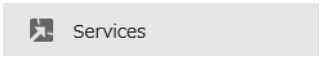
4 A list of the MAC addresses, IP addresses, and device names of the DLNA-compatible devices connected to the same network as the LinkStation is displayed. If your device is not listed, click *Refresh Database*.



Streaming to DLNA-compatible Devices

When new movies, photos, and music files are added to the LinkStation's DLNA folder, the database must be updated before the new files can be streamed. By default, the database is updated when the files are stored in the LinkStation. You can change this interval or update the database manually.

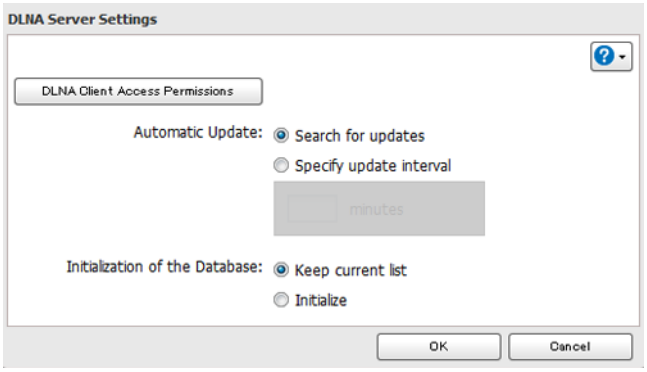
1 In Advanced Settings, click *Services*.



2 Click to the right of "DLNA Server".

3 Click *Edit*.

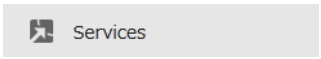
4 You may change the update interval, or select *Refresh Database* to update the database immediately.



Disabling Playback from Specific Devices

You may block specific DLNA devices from playing back media content.

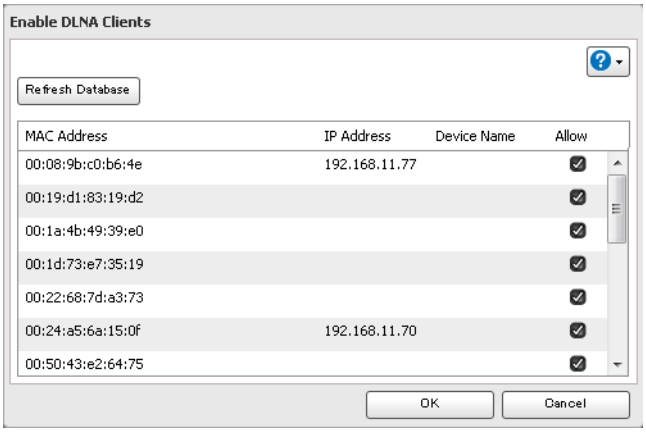
1 In Advanced Settings, click *Services*.



2 Click to the right of "DLNA Server".

3 Click *DLNA Client Access Permissions*.

4 Uncheck any devices you do not want to allow to play media and click *OK*.



Supported File Types

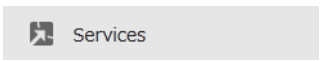
The LinkStation supports DLNA streaming of files with the extensions below.

Type	File Extensions
Video Files	mpe, mpeg, mpeg2, mpg, m2p, tts, m2ts, m2t, mts, m1v, m4v, mp4, mov, wmv, avi, divx, xvid, asf, dvr-ms, vob, 3gp, vdr, spts, tp, ts
Picture Files	jpg, jpeg, png, bmp, gif, tif, tiff, yuv
Music Files	mp3, wma, wav, lpcm, pcm, ogg, m4a, mp4, 3gp, flac, m3u, mpa, aac, apl, ac3, aif, aiff, mp2, mp1, dsf, dff

iTunes Server

If the iTunes server is enabled, computers on your network with iTunes can play music files stored on the LinkStation and transfer them to iOS devices. The iTunes server supports playback from up to five computers.

1 In Advanced Settings, click *Services*.

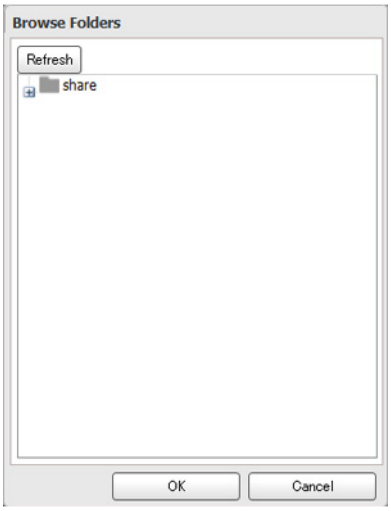


2 Click to the right of "iTunes Server".

3 Click *Edit*.

4 Click *Browse*.

5 Select the shared folder that you want to make available to iTunes, then click *OK*.



6 Click *OK*.

7 Make sure that the iTunes server is enabled. The iTunes server switch should be in the On position.

BitTorrent

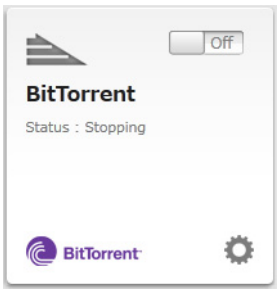
BitTorrent is a protocol for distributing large amounts of data efficiently. The information in this chapter is for users who are familiar with BitTorrent.

Notes:

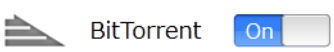
- The LS420DS series LinkStation doesn't support this function.
- Use compatibility mode to use "Download Manager" with Windows 8.1 or Windows 8.
- The download manager doesn't work with Internet Explorer 11. To open the download manager, use a different browser or an earlier version of Internet Explorer.
- The download manager is similar to "µTorrent".

Configuration from Easy Admin

1 Click *BitTorrent*.



2 Move the BitTorrent switch to the On position to enable BitTorrent.

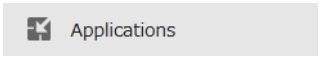


3 Select the shared folder to save files downloaded via BitTorrent from the drop-down list, then click *Apply*.

4 Go back to home and click *BitTorrent* to open the download manager. The default username is "admin" and the default password is blank (no password).

Configuration from Advanced Settings

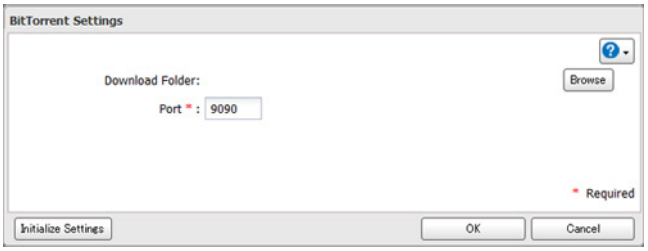
1 In Advanced Settings, click *Applications*.



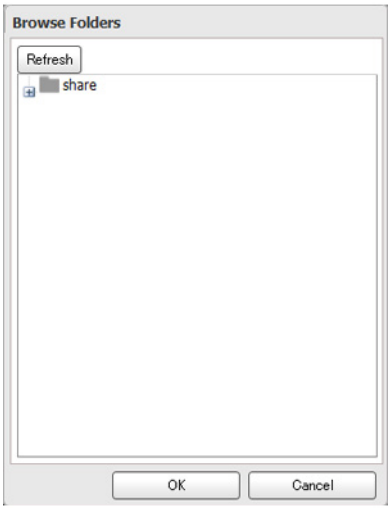
2 Click to the right of "BitTorrent".

3 Click *Edit*.

4 Click *Browse*.



5 Select the shared folder where the downloaded file will be saved, then click *OK*.



6 Enter the port number, then click *OK*.

7 Move the BitTorrent switch to the On position to enable BitTorrent.

8 Click to the right of "BitTorrent".

9 Click *Open Download Manager*. The default username is "admin" and the default password is blank (no password).

10 The download manager will open.

Connecting a Printer

You can connect a printer to the USB port on the LinkStation.

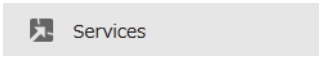
Notes:

- Only one USB printer can be connected to the LinkStation.
- Bidirectional communication is not supported i.e., remaining ink quantities and other printer status information is not supported.
- If a multifunctional printer is connected, only the printer function can be used. Other functions such as scanning will not be available. If you need bidirectional communication or multifunction features such as scanning to work, connect the printer with USB device server instead.
- The print server does not support Mac OS.
- Don't disable the SMB protocol while the print server is enabled. If you do, you will need to enable SMB again and reconfigure the print server from scratch.

Windows 8.1, Windows 8, Windows 7, or Windows Vista

1 Connect a printer to the LinkStation's USB port, then turn the printer on.

2 In Advanced Settings, click *Services*.



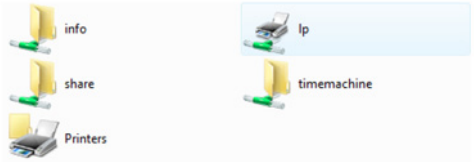
3 Move the print server switch to the

position to enable the print server.

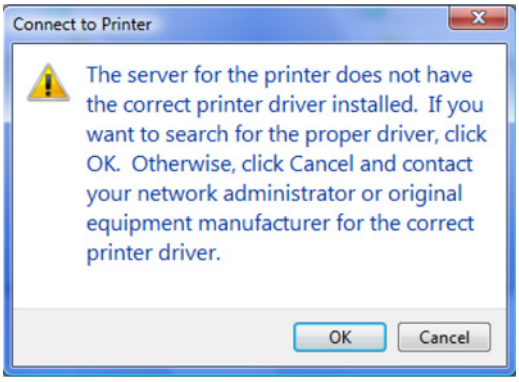
4 Refer to the manual supplied with the printer and install the printer drivers.

5 Launch NAS Navigator2. Double-click your LinkStation's icon.

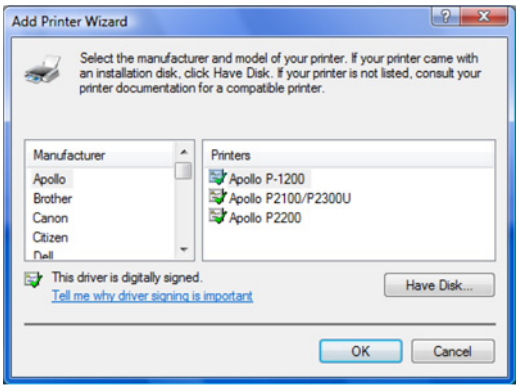
6 Double-click the icon of the connected printer (shared name is displayed).



7 Click *OK*.


Connect to Printer
The server for the printer does not have the correct printer driver installed. If you want to search for the proper driver, click OK. Otherwise, click Cancel and contact your network administrator or original equipment manufacturer for the correct printer driver.
OK
Cancel

8 Select your printer, then click *OK*.

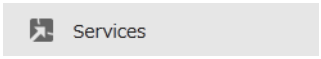

Add Printer Wizard
Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Manufacturer
Apollo
Brother
Canon
Citizen
Printers
Apollo P-1200
Apollo P2100/P2300U
Apollo P2200
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
OK
Cancel

9 Register the printer.

Windows XP

1 Connect a printer to the LinkStation's USB port, then turn the printer on.

2 In Advanced Settings, click *Services*.



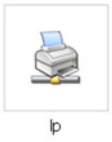
3 Move the print server switch to the

position to enable the print server.

4 Refer to the manual supplied with the printer and install the printer drivers.

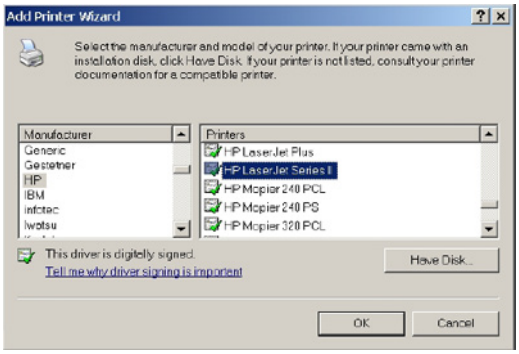
5 Launch NAS Navigator2. Double-click your LinkStation's icon.

6 Double-click your printer icon.



7 When "The server for the printer does not have the correct printer driver installed. If you want to search for the proper driver, click *OK*." displays, click *OK*.

8 Select the driver for your printer, then click *OK*.


Add Printer Wizard
Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Manufacturer
Generic
Gestetner
HP
IBM
Infotec
Iwatsu
Printers
HP LaserJet Plus
HP LaserJet Series II
HP Mopier 240 PCL
HP Mopier 240 PS
HP Mopier 320 PCL
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
OK
Cancel

9 Register the printer.

USB Device Server

The USB device server lets you use USB devices connected to the LinkStation with multiple computers.

Note: The LS420DS series LinkStation doesn't support this function.

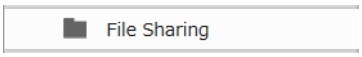
1 Connect the USB device directly to your computer and install its drivers and software normally.

Dismount and remove the USB device when installation is complete.

2 Connect the USB device to the LinkStation's USB port.

Note: With the USB device server enabled, you may connect a single USB hub to the LinkStation. Up to 15 USB devices may be connected to the hub. Don't connect more than one bus-powered drive at a time. Use a separate AC power connection for each device if possible. Connecting more than one bus-powered device at a time may damage both the LinkStation and the devices.

3 In Advanced Settings, click *File Sharing*.



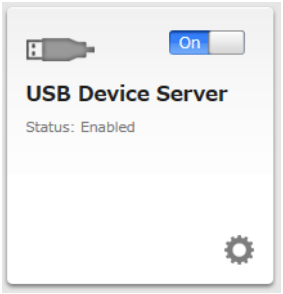
4 Click to the right of "Folder Setup".

5 Select the USB device connected to the LinkStation.

Note: USB device server and DLNA are not compatible. Disable DLNA protocol support if using USB device server.

6 Move the USB device server switch to the On position to enable the USB device server.

You can also enable the USB device server from Easy Admin.



Note: When the USB device server is enabled, other functions that use the USB port won't be available.

7 To install Network-USB Navigator, click *USB Device Server* in Easy Admin or navigate to *Services - USB Device Server - USB Device Server* in Advanced Settings. You'll need administrator privileges to install the software.

Connecting with Network-USB Navigator

1 Launch Network-USB Navigator.

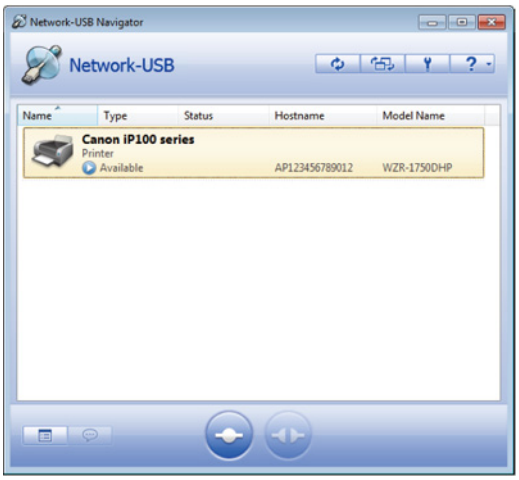
For Windows:

Navigate to *(All) Programs - BUFFALO - Network-USB Server*, then click *Network-USB Navigator*. On Windows 8.1 and Windows 8, click *Network-USB Navigator* from the Start screen.

For Mac:

Navigate to *Macintosh HD - Applications - BUFFALO - Device Server - Network-USB Navigator*.

2 Select the USB device, then click the button to connect.



3 The selected USB device will install automatically.

Refer to the help by clicking the button for help information and software details.

Notes:

- Only one computer can access the USB device at a time.
- Disable the DLNA protocol if using USB device server.

Disconnecting USB Devices

Select the USB device, then click the icon to disconnect. Make sure that no one else is using the USB device before disconnecting it.

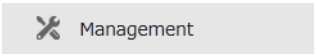
Chapter 8 Advanced Features

Email Notification

Your LinkStation can send you email reports daily, or when settings are changed or an error occurs. Notification emails may be triggered by any of the following events:

- Scheduled hard drive status notification (includes quota exceeded notification)
- Fan error
- Backup job completed
- Hard drive read error

1 In Advanced Settings, click *Management*.



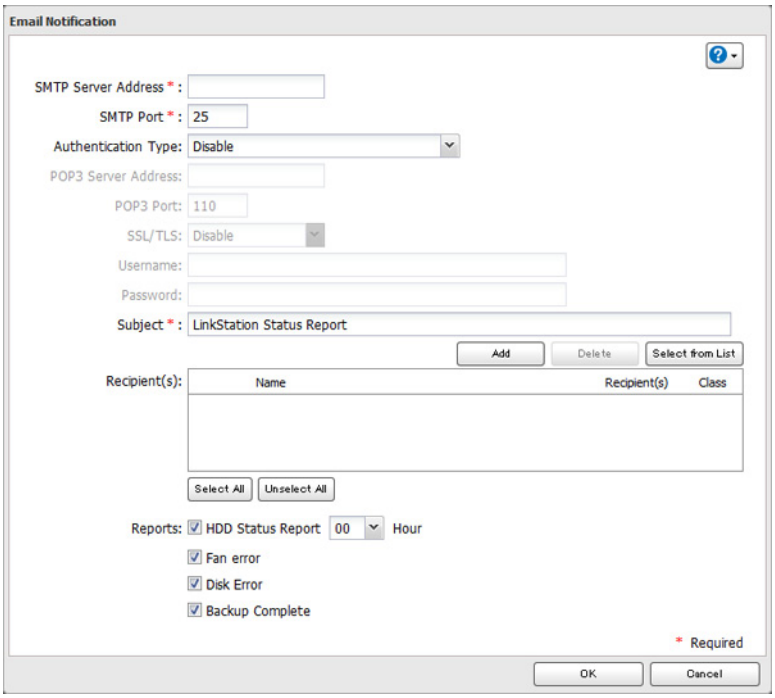
2 Move the email notification switch to the

position to enable email notification.

3 Click to the right of "Email Notification".

4 Click *Edit*.

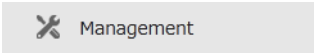
5 Enter your mail server settings and choose what events will trigger notification. Click *OK* to send a test email.



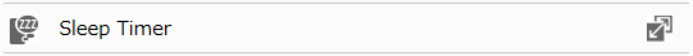
Sleep Mode

To save energy, you can specify times to put the LinkStation into sleep (standby) mode, where the hard drive and LEDs are turned off.

1 In Advanced Settings, click *Management*.

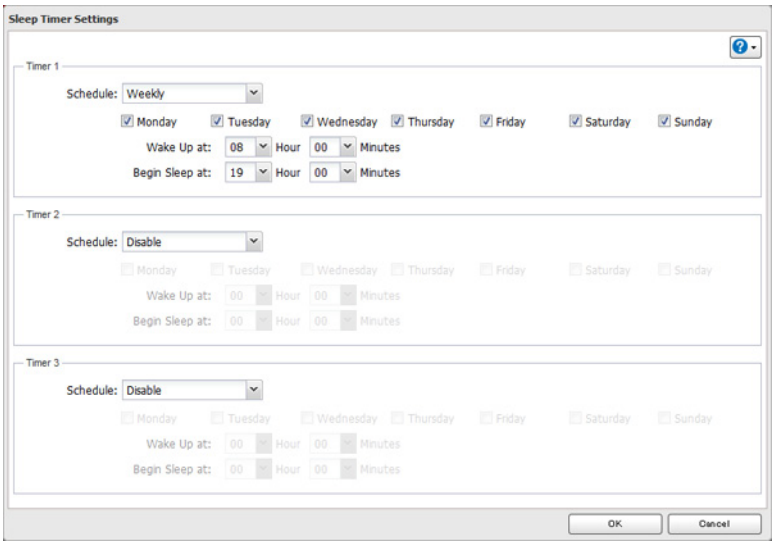


2 Click to the right of "Sleep Timer".



3 Click *Edit*.

4 Specify the timer interval, wake-up time, and time to go into sleep mode, then click *OK*.



Notes:

- Up to three timers can be set.
- The time to enter sleep mode can be set from 0:00 am to 3:45 of the next day.
  The time to wake from sleep mode can be set from 0:00 to 23:45.
  If the time to enter sleep mode is after 24:00, the wake-up time setting may be from 4:00 am to 23:45.
- The time to enter sleep mode should not be set at the same time as or before the wake-up time.
- If a backup job is scheduled during a disk check, disk format, backup job or within 5 minutes of the current time, the LinkStation will not change to standby mode when the time to enter sleep mode is reached.
- If the scheduled times in the timer overlap, operation is performed using the widest time interval.
- Examples of multiple timer settings are shown below.
  Example 1:
  If running at a current time of 10:00 Wednesday
  Timer 1: Daily 12:00–24:00
  Timer 2: Not used
  Timer 3: Not used
  No operation is performed at 12:00 and the unit goes into sleep mode at 24:00.
  Example 2:
  When running at a current time of 10:00 Wednesday
  Timer 1: Daily 9:00–18:00
  Timer 2: Wednesday 10:00–20:00
  Timer 3: Not used

On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00.
On Wednesday, the unit goes into sleep mode at 20:00.

Example 3:

If running at the current time of 10:00 Wednesday
Timer 1: Daily 9:00–18:00
Timer 2: Wednesday 10:00–3:00 the next day
Timer 3: Not used
On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00.
On Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 1:00 the next day.

Example 4:

When running at a current time of 10:00 Wednesday
Timer 1: Daily 9:00–18:00
Timer 2: Wednesday 7:30–22:00
Timer 3: Not used
On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00.
On Wednesday, normal operation begins at 7:30 and the unit goes into sleep mode at 22:00.

- To turn on the LinkStation before the wake-up time when it is in sleep mode, press the function button.

Encrypting Data Transmission

Encrypting Settings Data

All communication with Settings can use SSL encryption if you access Settings through https://.

Encrypting FTP Transfer Data

You can encrypt passwords and files using SSL/TLS for secure FTP communication. First, open a shared folder's settings and click *Edit*; under "LAN Protocol Support", check "FTP" and click *OK*. Enable SSL security in the setup screen for your FTP client. The procedure depends on the FTP client software.

SSL Encryption

SSL is a cryptographic protocol for communication security and data confidentiality over the Internet. To use SSL, you will need a certificate and a key. These are available from web hosting services and many private privacy providers.

Configuring SSL

To enter or update a server certificate and private key for SSL, following this procedure.

1 Navigate to *Management* - *SSL*.

2 Enter or browse to the locations of the key and certificate, then click *Import*.

UPS (Uninterruptible Power Supply)

If a UPS (sold separately) is attached, the LinkStation can be automatically shut down for protecting data in the event of a power outage.

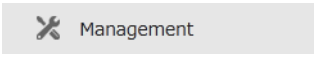
1 Plug the power cable of the UPS to a wall socket.

2 Connect the AC cable of the LinkStation to the UPS.

3 Connect the UPS and LinkStation using a USB cable or serial cable.

4 Turn on the UPS, then the LinkStation.

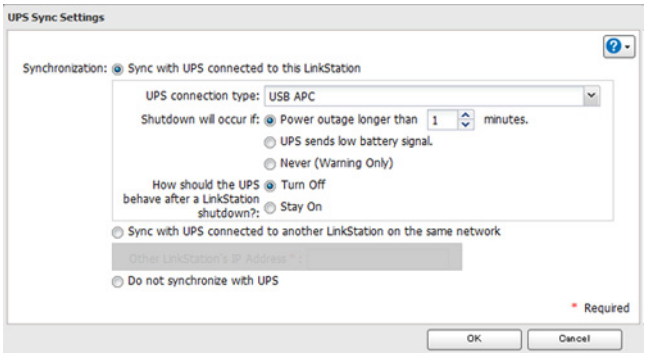
5 In Advanced Settings, click *Management*.



6 Click to the right of "UPS Sync".

7 Click *Edit*.

8 Configure the desired settings, then click *OK*.



Notes:

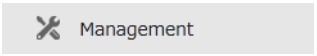
- If the LinkStation is connected directly to a UPS, select "Sync with UPS connected to this LinkStation". If a different LinkStation is connected to the UPS, select "Sync with UPS connected to another LinkStation on the same network". After making this selection, enter the IP address of the LinkStation that will be the sync source in "Other LinkStation's IP Address".
- When the LinkStation is rebooted after an automatic shutdown due to a power outage or other power supply problem, verify that the power supply has been restored. If the LinkStation is turned on while it is still running on the UPS and without the power supply restored, automatic shutdown is not performed, even after the specified time has elapsed.
- If the power supply from the UPS to the LinkStation is stopped and restarted when UPS recovery is enabled, the LinkStation is automatically restarted.

Restoring Factory Defaults

To initialize the LinkStation to its factory default settings, follow this procedure.

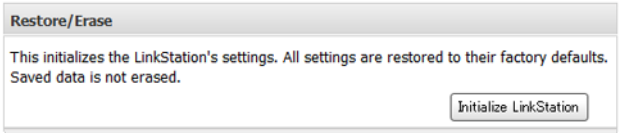
Initializing from Settings

1 In Advanced Settings, click *Management*.



2 Click to the right of "Restore/Erase".

3 Click *Initialize LinkStation*.


Restore/Erase
This initializes the LinkStation's settings. All settings are restored to their factory defaults.
Saved data is not erased.
Initialize LinkStation

4 The "Confirm Operation" screen will open. Enter the confirmation number, then click *OK*.

5 The LinkStation will be restored to its factory default settings.

Initializing with the Function Button

You can also initialize the settings with the function button.

1 Turn off the LinkStation.

2 Turn the LinkStation on while holding down the function button. The function LED will flash white.

3 Press the function button again while the LED is flashing.

4 Initialization will take 5 to 10 minutes. Do not power down the LinkStation while it is initializing and showing an I23 information message in NAS Navigator2 and with the power LED. When initialization is finished, the LinkStation will automatically reboot.

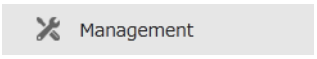
Notes:

- The following settings will be initialized: admin username, admin password, IP address, and Ethernet frame size.
- To disable initializing username and password, navigate to *Management - Restore/Erase - Edit* and change "Restore factory default settings" to "Keep current settings". Be careful with this option! If this is selected and you lose your admin password, you will not be able to reset it.

Online Update

If a new firmware is available, a message is displayed when the LinkStation boots. You can update the firmware as follows:

1 In Advanced Settings, click *Management*.



2 Click to the right of "Update".

3 Click *Install Update*.

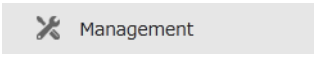
Notes:

- Settings is not available while the firmware is updating. Don't try to access Settings from another computer until the update is complete.
- You can disable update notifications in *Management - Update*.
- To clear an update notification, press the function button.

Name, Date, Time, and Language

Configure the LinkStation's hostname, date, time, and language as follows.

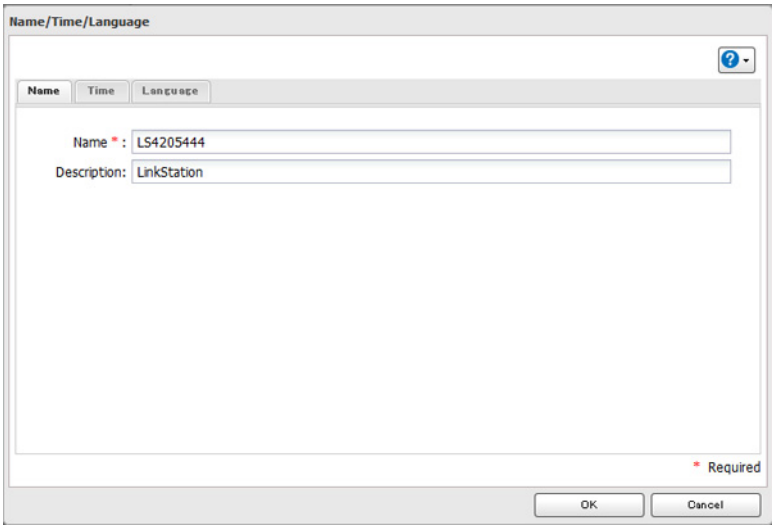
1 In Advanced Settings, click *Management*.



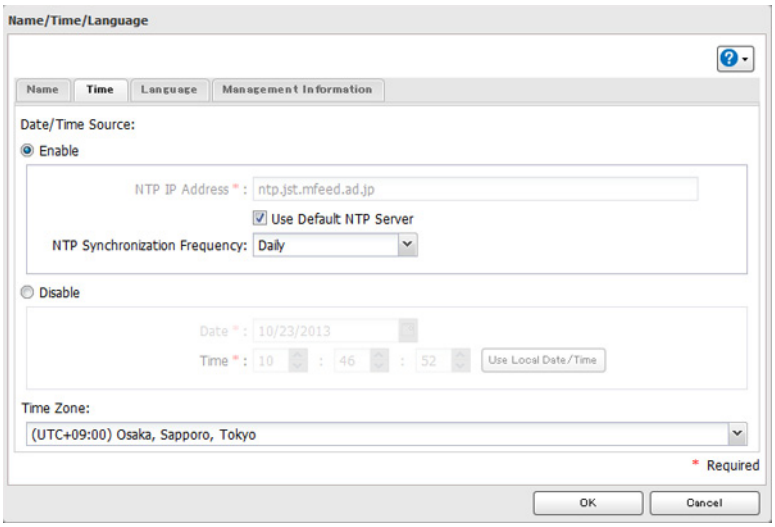
2 Click to the right of "Name/Time/Language".

3 Click *Edit*.

4 Click the *Name* tab and configure the LinkStation's name and description.



5 Click the *Time* tab. Enable NTP server and check "Use Local Date/Time" to use your computer's time settings for the LinkStation.

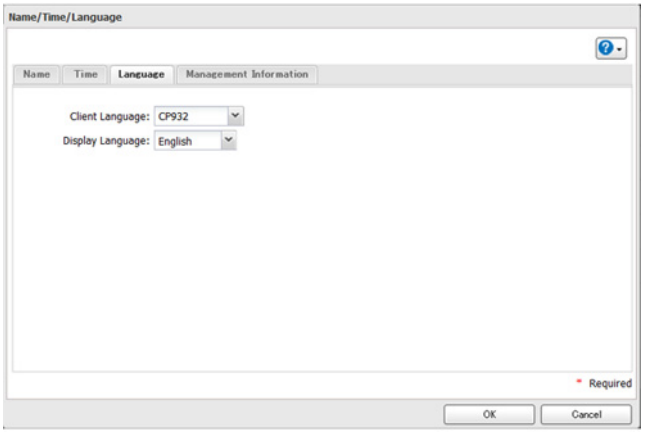


By default, the LinkStation adjusts its clock automatically by using a default NTP server. This NTP server belongs to Internet Multi Feed Inc. For more information, visit http://www.jst.mfeed.ad.jp.
To use a different NTP server, navigate to *Management* - *Name/Time/Language*. Click *Time*, then *Edit*. Uncheck "Use Default NTP Server" and enter a new NTP IP address. Click *OK*.
If NTP is not used, enter the time and date manually. Click *Use Local Date/Time* to import the time and date from your computer.

If an NTP server is specified by name instead of IP address, make sure that a DNS server is configured for the LinkStation.

Note: The internal clocks of the LinkStation and other devices on your network may run at slightly different speeds. Over a long period of time your network devices may show somewhat different times, which can cause network problems. If clocks on your network vary by more than 5 minutes it may cause unexpected behavior. For best results, keep all clocks on the network set to the same time by adjusting them regularly, or use an NTP server to correct them all automatically.

6 Click the *Language* tab. Select the language to be used in the Windows client, then click *OK*.

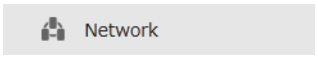


Note: This tab changes the language used by the LinkStation for email notification, DLNA, and other functions. To change the language displayed in Settings, go to Advanced Settings or Easy Admin and click *Language* in the menu bar. Choose your desired language from the drop-down menu.

Jumbo Frames

If your other network devices support it, you may be able to increase network performance with jumbo frames.

1 In Advanced Settings, click *Network*.

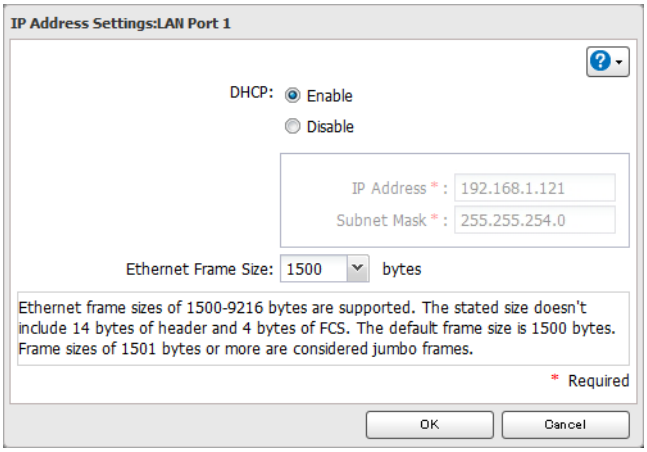


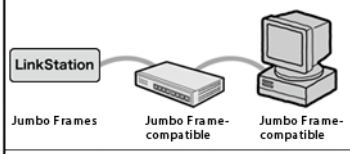
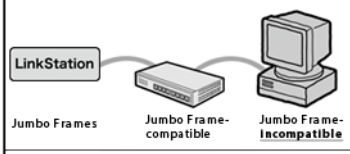
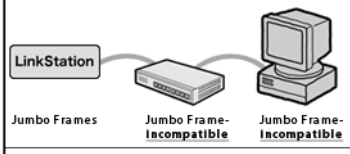
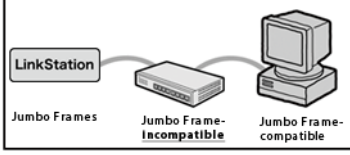
2 Click to the right of "IP Address".

3 Click the LAN port where the jumbo frames will be used.

4 Click *Edit*.

5 Select your desired Ethernet frame size and click *OK*.

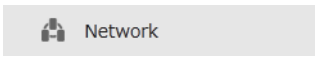

IP Address Settings:LAN Port 1
DHCP:
Enable
Disable
IP Address * : 192.168.1.121
Subnet Mask * : 255.255.254.0
Ethernet Frame Size: 1500 bytes
Ethernet frame sizes of 1500-9216 bytes are supported. The stated size doesn't include 14 bytes of header and 4 bytes of FCS. The default frame size is 1500 bytes. Frame sizes of 1501 bytes or more are considered jumbo frames.
* Required
OK
Cancel

Connections	Data Transfer	
	○	Data transferred by jumbo frames (4084/7404/9216 bytes).
	△	Data transferred by standard frames (1500 bytes).
	△	Data transferred by standard frames (1500 bytes).
	×	No data transferred.

Changing the IP Address

Normally, the LinkStation's IP address is set automatically from a DHCP server on your network. If you prefer, you can set it manually. An easy way to do this is to change it from NAS Navigator2 running on a computer connected to the same router (subnet) as the LinkStation. The procedure to change the IP address in Settings is below.

1 In Advanced Settings, click *Network*.



2 Click ⧉ to the right of "IP Address".

3 Select the LAN port.

4 Click *Edit*.

5 Disable "DHCP", enter the desired network address settings, and click *OK*.

Note: The following IP addresses are reserved and should not be used. If you configure one of them by accident, initialize settings with the function button on the LinkStation.

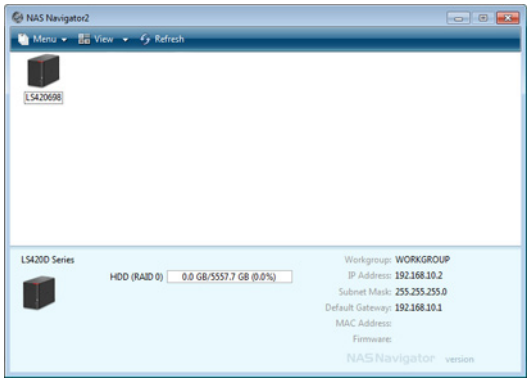
Local loopback address: 127.0.0.1, 255.255.255.0
Network address: 0.0.0.0, 255.255.255.0
Broadcast address: 255.255.255.255, 255.255.255.0
The IP address range from 224.0.0.0 to 255.255.255.255

Chapter 9 Utilities

NAS Navigator2 for Windows

NAS Navigator2 is a utility program that makes it easy to display Settings, change the LinkStation's IP address, or check its hard drive. If you installed the LinkStation with LinkNavigator, NAS Navigator2 was installed automatically. NAS Navigator2 will run in the system tray when the computer is on.

Double-click the icon to start NAS Navigator2.



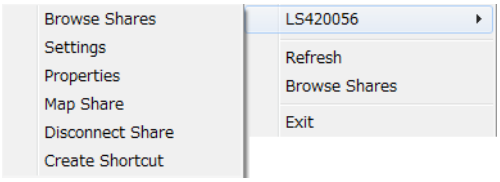
Click your LinkStation's icon to open a share on the LinkStation and display:

- Total capacity
- Capacity in use
- IP address
- Workgroup
- Subnet mask
- Default gateway
- MAC address
- Firmware version

Name		Description
Menu	Map Share*	Assigns the LinkStation's shared folder as a network drive.
	Disconnect Share*	Unmaps the network drive.
	Map All Remote Shares to Drive Letters	Assigns all the LinkStation's shared folders as network drives.
	Create Desktop Shortcut*	Creates a shortcut to the LinkStation's shared folder (share).
	Launch NAS Navigator2 on Startup	Launches NAS Navigator2 in the system tray when Windows boots.
	Display Errors	If an error occurs, an error message will pop up from the NAS Navigator2 icon in the system tray.
	Properties*	Opens the selected LinkStation's properties page.
	Close	Closes NAS Navigator2.
	View	Icons: Displays icons. Details: Displays hostname, product name, workgroup, IP address, subnet mask, and default gateway.
	Sort by	If you have multiple LinkStations and TeraStations on the network, you may choose to display them in order of hostname, product name, workgroup, IP address, subnet mask, or default gateway.
Browse*		Opens the LinkStation's shared folder.
Refresh		Searches for NAS devices on the network again.
Displays when you right-click a device's icon.	Browse Shares	Opens the LinkStation's shared folder.
	Settings	Opens Settings for the selected LinkStation.
	Properties	Opens the LinkStation's properties page.
	Map Share	Assigns the LinkStation's shared folder as a network drive.
	Disconnect Share	Unmaps the network drive.
	Create Shortcut	Creates a shortcut icon to the shared folder "share" on the desktop.

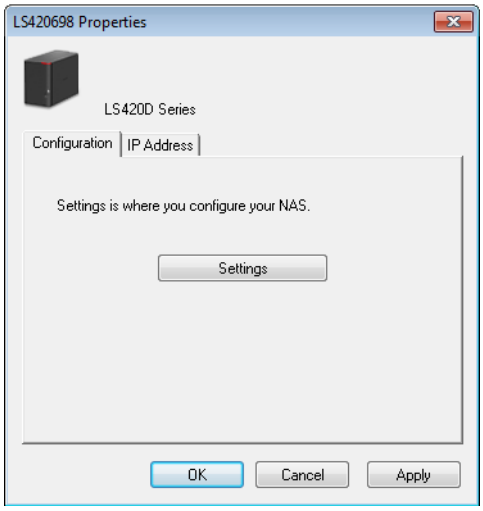
*Click on the LinkStation's icon to display these options.

When NAS Navigator2 is minimized, right-click on the NAS Navigator2 icon in the system tray for the following options.



Name		Description
NAS Name	Browse Shares	Opens the LinkStation's share folder.
	Settings	Opens Settings for the selected LinkStation.
	Properties	Opens the LinkStation's properties page.
	Map Share	Assigns the LinkStation's shared folder as a network drive.
	Disconnect Share	Unmaps the network drive.
	Create Shortcut	Creates a shortcut icon to the LinkStation's shared folder (share) on the desktop.
Refresh		Refreshes list of NAS devices.
Browse Shares		Displays NAS Navigator2 window.
Exit		Exits NAS Navigator2.

The following tasks may be performed from the LinkStation's properties page.



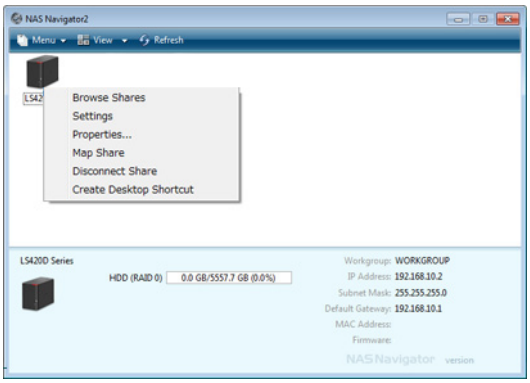
Name	Description
Configuration	Click *Settings* to open the configuration interface.
IP Address	Check *Use DHCP* to assign an IP address from the DHCP server automatically. If there is no DHCP server in the network, you cannot use this function. Check *Renew IP address* to obtain an IP address from the DHCP server. You can manually enter an IP address, subnet mask, and default gateway.

Mount as Network Drive

You can easily map a shared folder as a network drive using NAS Navigator2.

1 Double-click the icon to start NAS Navigator2.

2 Right-click on the LinkStation's icon and choose *Map Share*.



Note: The following shared folders can be mounted as network drives from NAS Navigator2: share, share2, share3, share4, usbdisk1, usbdisk2, usbdisk3, usbdisk4, usbdisk5

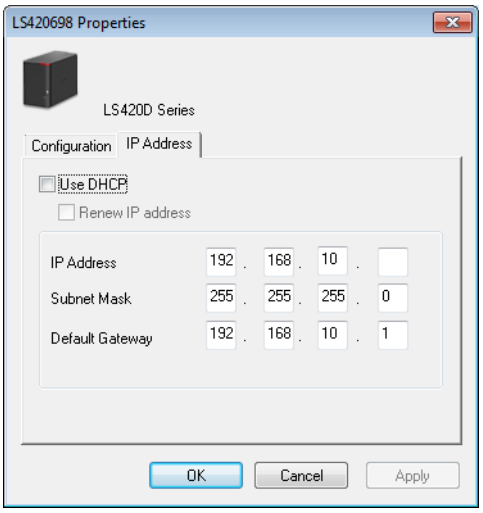
3 An icon for the mapped share will appear in Computer or My Computer. You can use this network drive just like any other hard drive.

Changing the IP Address

1 Double-click the icon to start NAS Navigator2.

2 Right-click on your LinkStation's icon and choose *Properties - IP Address*.

3 Uncheck "Use DHCP", enter the IP address and subnet mask, and click *OK*. If the username and password prompts appears, enter the admin username and password.



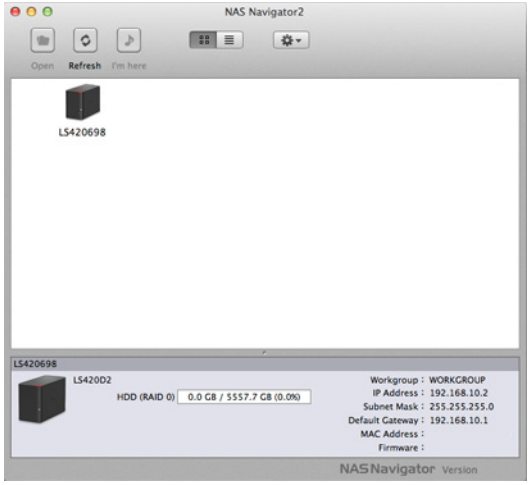
Note: The following IP addresses are reserved and should not be used. If you configure one of them by accident, initialize settings with the function button on the LinkStation.

Local loopback address: 127.0.0.1, 255.255.255.0
Network address: 0.0.0.0, 255.255.255.0
Broadcast address: 255.255.255.255, 255.255.255.0
The IP address range from 224.0.0.0 to 255.255.255.255

NAS Navigator2 for Mac OS

NAS Navigator2 is a utility that makes it easy to display Settings, change the LinkStation's IP address, or check its hard drive. If you installed the LinkStation with LinkNavigator, NAS Navigator2 was installed automatically.

Click the icon in the Dock to start NAS Navigator2.



Click your LinkStation's icon to open a share on the LinkStation and display:

- Total capacity

- Capacity in use
- IP address
- Workgroup
- Subnet mask
- Default gateway
- MAC address
- Firmware version

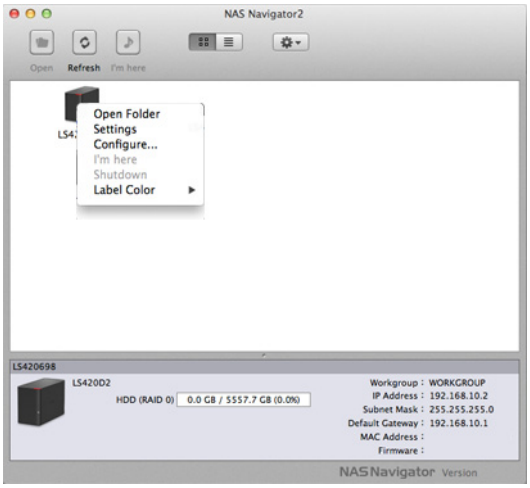
Name		Description
Open		Opens the default shared folder for a selected LinkStation.
Refresh		Searches for NAS devices on the network again.
Settings		Opens Settings for the selected LinkStation.
Configure		Opens a window that lets you configure the NAS's IP address or open Settings.
Label Color		Selects the color of the name displayed below the icon.
View Options		Lets you choose icon size, position, and view mode.
Auto Power Mode		Auto power mode can turn supported TeraStations and LinkStations on the network on and off automatically.
To display these options, hold down the control key and click your LinkStation's icon.	Open Folder	Opens the LinkStation's shared folder.
	Settings	Opens Settings for the selected LinkStation.
	Configure	Opens a window that lets you configure the NAS's IP address or open Settings.
	Label Color	Selects the color of the name displayed below the icon.

Mount as Network Drive

You can map a shared folder as a network drive from NAS Navigator2.

1 Click the icon in the Dock to start NAS Navigator2.

2 Double-click the LinkStation icon or click the LinkStation icon while holding down the control key, then select *Open Folder*. Enter a username and password with the rights to access the shared folder.



3 Select the shared folder to mount and click *OK*.

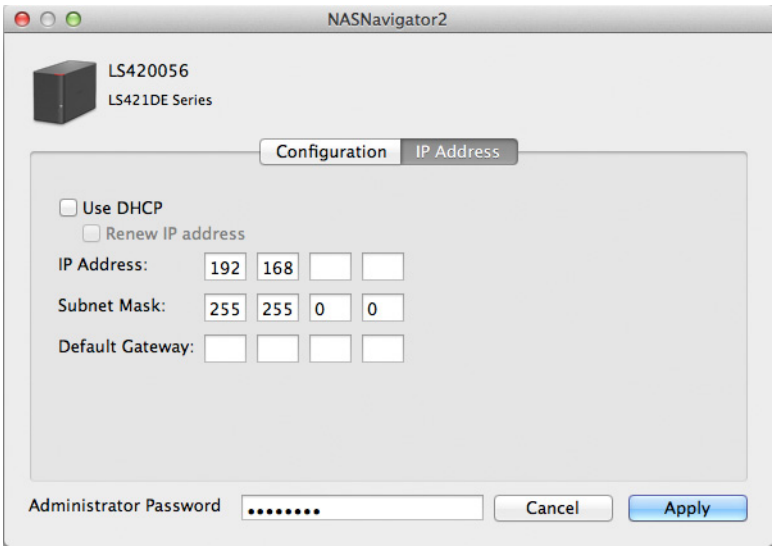
4 The shared folder is now mounted as a network drive.

Changing the IP Address

1 Click the icon in the Dock to start NAS Navigator2.

2 Hold down the control key, select your LinkStation, and choose *Configure - IP Address*.

3 Uncheck "Use DHCP", enter the desired settings and the administrator password, then click *Apply*.



Note: The following IP addresses are reserved and should not be used. If you configure one of them by accident, initialize settings with the function button on the LinkStation.

Local loopback address: 127.0.0.1, 255.255.255.0
Network address: 0.0.0.0, 255.255.255.0
Broadcast address: 255.255.255.255, 255.255.255.0
The IP address range from 224.0.0.0 to 255.255.255.255

Chapter 10 Appendix

When the Power LED Blinks

White

The power LED will blink white during bootup or shutdown.

Red

If there is an error, the power LED will blink red. The pattern of the blink gives the error code. You can also see any errors in NAS Navigator2.

Place of Error Code	Status
10s Place of Error Code	The LED flashes for 1.0 second every 0.3 seconds. This gives the tens place of the error code.
1s Place of Error Code	The LED flashes for 0.5 seconds every 0.3 seconds. This gives the ones place of the error code.

Error Code	Description	Corrective Action
E07	The firmware is corrupted.	Contact Buffalo technical support for assistance.
E11	An error occurred in the fan speed.	Check the fan. Use compressed air or tweezers to remove any dust or foreign objects. Confirm that the fan is spinning normally. If it is not, contact Buffalo technical support for assistance.
E12	A rise in the system temperature may have exceeded the allowable safety value.	Do not place objects in the area around the LinkStation. Also, move the LinkStation to a cool location.
E13	An error occurred in the RAID array. The LinkStation is in degraded mode.	Replace the defective drive. Reboot the LinkStation and rebuild the RAID array.
E14	RAID array x cannot be mounted.	Run the RAID array disk check in Settings.
E15	The bad sectors have reached a dangerous level.	Replace the defective drive.
E16	Unable to find hard drive x.	Hard drive x may be disconnected or may have failed. Shut down the LinkStation and reinstall the hard drive.
E22	Unable to mount drive x.	Format the hard drive. After formatting, if the error still appears after rebooting, replace the hard drive. If the error is displayed again, contact Buffalo technical support for assistance.
E23	An error occurred, so the hard drive was removed from the RAID array.	Replace the faulty drive.
E30	A hard drive error occurred.	Replace the faulty drive.

Amber

If there is a status message, the power LED will blink amber. The pattern of the blink gives the information code. You can also see any status messages in NAS Navigator2.

Place	Status
10s Place	The LED flashes for 1.0 seconds every 0.3 seconds. This gives the tens place of the information code.
1s Place	The LED flashes for 0.5 seconds every 0.3 seconds. This gives the ones place of the information code.

Information Code	Description	Corrective Action
I10	System temperature is too high.	Move the LinkStation to a cool location. Do not place objects in the area around the LinkStation.
I11	Drive x has too many bad sectors.	Replace hard drive x.
I12	Operating in degraded mode.	-
I13	Formatting RAID array x.	-
I14	Checking RAID array x.	-
I15	Examining the error status of RAID array x. **Note:** Transfer speeds are slower during the examination process.	-
I16	Creating RAID array x.	-
I17	Resynchronizing RAID array x. **Note:** Transfer speeds are slower during resynchronization.	-
I18	Rebuilding RAID array x. **Note:** Transfer speeds are slower during the rebuilding process.	-
I19	Writing 0s to RAID array x, erasing all data.	-
I20	Formatting hard drive x.	-
I21	Checking hard drive x.	-
I22	Erasing the data for hard drive x.	-
I23	System is being initialized.	-
I25	Updating the LinkStation firmware.	-
I26	Initializing all settings.	Don't turn off the LinkStation.
I27	Checking USB hard drive.	-
I28	Formatting USB hard drive.	Don't turn off the LinkStation.
I46	Data migration or conversion (RAID migration) is in progress.	Don't turn off the LinkStation.
I47	Data migration or conversion (RAID migration) is in progress.	Don't turn off the LinkStation.
I52	A new firmware version has been released.	Update the firmware.
I54	A backup job has failed.	Make sure that the backup job is configured correctly. Make sure that the NAS is on and not in standby mode. If the backup job still fails, check the status of the network and backup source and destination.

Amber (Not Blinking)

When the power LED glows a steady amber, a new firmware version is available. Update the firmware to the newest version.

Default Settings

Administrator's Name	admin
Password	password
Shared Folders	"share" (for both Windows and Mac computers) - The recycle bin is enabled by default. "Recordings" (LS420DS only) - Access restrictions are enabled for guest user accounts and the recycle bin is disabled by default.
DHCP Client	Normally, the LinkStation will get its IP address automatically from a DHCP server on the network. If no DHCP server is available, then an IP address will be assigned as follows: IP address: 169.254.xxx.xxx (xxx is assigned randomly when booting the LinkStation.) Subnet mask: 255.255.0.0
Registered Groups	"hdusers", "admin", and "guest" are default groups and cannot be edited or deleted.
Microsoft Network Group Setting	WORKGROUP
Ethernet Frame Size	1500 bytes (not including 14 bytes of header and 4 bytes of FCS)
SMB2	Disabled
AFP	Enabled (The default setting for LS420DS is "Disabled".)
FTP	Disabled
NTP	Enabled
Print Server	Disabled
WebAccess	Disabled
Time Machine	Disabled
Direct Copy	Disabled
DLNA*	Disabled
iTunes Server	Enabled
BitTorrent*	Disabled
USB Device Server*	Disabled
Function Button Initialization	Restore factory default settings
Update Notification	Enabled
RAID Mode	LS420D: RAID 0 LS420DS: RAID 1

*LS420DS series LinkStation does not have this function.

Specifications

Check the Buffalo website for the latest product information and specifications.

LAN Port	Interface	IEEE 802.3ab (1000BASE-T) IEEE 802.3u (100BASE-TX) IEEE 802.3 (10BASE-T)
	Transfer Speed	1000 Mbps Full duplex (auto-negotiation) 100 Mbps Full duplex/Half duplex (auto-negotiation) 10 Mbps Full duplex/Half duplex (auto-negotiation)
	Number of Ports	1 port (supports auto-MDIX)
	Connector Type	RJ-45 8-pin
	Protocol	TCP/IP
	Access Method	CSMA/CD
	File Sharing	SMB/CIFS, AFP, FTP/FTPS, HTTP/HTTPS
	Management	HTTP/HTTPS
	Jumbo Frames	1500, 4084, 7404, and 9216 byte modes are supported. (not including 14 bytes of header and 4 bytes of FCS)
USB Port	LS420D, LS420DS, LS410D: USB 2.0 Port (Series A) x 1 LS421DE: USB 2.0 Port (Series A) x 1, USB 3.0 Port (Series 1) x 1 **Note:** Compatible USB devices include printers, USB UPS devices, and Buffalo USB hard drives.	
Internal Hard Drive	If a hard drive in your LinkStation malfunctions, replace it with a Buffalo drive of the same capacity. Use a Buffalo OP-HD/A series drive for the LS420DS and a OP-HDBST series drive for other LS400 series LinkStations. The drives listed above are available from the Buffalo website.	
Power Supply	AC 100–240 V, 50/60 Hz	
Dimensions (W x H x D)	LS410D: 205 x 128 x 45 mm; 8.1 x 5.0 x 1.8 in. LS420D, LS420DS: 205 x 128 x 87 mm; 8.1 x 5.0 x 3.4 in. LS421DE: 205 x 128 x 87 mm; 8.1 x 5.0 x 3.4	
Weight	LS410D: 1.3 kg; 2.9 lb. LS420D, LS420DS: 2.4 kg; 5.3 lb. LS421DE: 0.8 kg; 1.8 lb.	
Power Consumption (Max.)	LS410D: 24 W LS420D, LS420DS: 48 W LS421DE: 48 W	
Operating Environment	Temperature: 5–35°C; 41–95°F Environment humidity: 20–80% (no condensation)	
Compatibility	Windows and Mac computers with Ethernet interface **Note:** The LinkStation requires an Ethernet connection with your computer for operation. It cannot be connected via USB.	
Supported OS	Windows 8.1*, Windows 8*, Windows 7*, Windows Vista*, Windows XP, Windows 2000, Windows XP Media Center Edition (2004 or 2005), Windows Server 2012, Windows Server 2008 R2, Windows Server 2008 OS X 10.9, 10.8, 10.7, 10.6 *32-bit and 64-bit	

Models

LS410D0101, LS410D0201, LS410D0301, LS410D0401
LS420D0202, LS420D0402, LS420D0602, LS420D0802
LS421DE, LS421D0202, LS421D0402, LS421D0602, LS421D0802
LS420D0402S

Chapter 11 Regulatory Compliance Information

For Customers in the United States

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Only use the cables and accessories that are included in the package. Don't use other accessories or cables unless specifically instructed to in the documentation.

For Customers in Europe

EU Declaration of Conformity

Dansk
Der må kun bruges de kabler og det tilbehør der er inkluderet i pakken. Der må ikke bruges andet tilbehør eller kabler, medmindre det er udtrykkeligt beskrevet i dokumentationen.

Deutsch
Verwenden Sie ausschließlich die Kabel und Zubehörteile, die im Lieferumfang enthalten sind. Andere Zubehörteile oder Kabel dürfen nur dann verwendet werden, wenn dies in der Dokumentation ausdrücklich vorgeschrieben ist.

English
Only use the cables and accessories that are included in the package. Don't use other accessories or cables unless specifically instructed to in the documentation.

Español

Utilice únicamente los cables y accesorios incluidos en el paquete. No utilice otros accesorios ni cables a menos que así se indique en la documentación.

Français
Utilisez uniquement les câbles et accessoires inclus dans ce package. N'utilisez aucun autre accessoire ou câble sauf instruction spécifique de la documentation.

Italiano
Utilizzare esclusivamente i cavi e gli accessori inclusi nell'imballaggio. Non utilizzare altri accessori o cavi a meno che non sia specificamente indicato nella documentazione.

Nederlands
Gebruik alleen de kabels en toebehoren die zich in de verpakking bevinden. Gebruik geen ander toebehoren of kabels tenzij dit uitdrukkelijk in de handleiding wordt aangegeven.

Norsk
Bruk kun kabler og tilbehør som er inkludert i pakken. Ikke bruk annet tilbehør eller kabler med mindre spesielt instruert til å gjøre det i dokumentasjonen.

Português
Utilizar apenas cabos e acessórios incluídos na embalagem. Não utilizar outros acessórios ou cabos, salvo se especificamente indicado na documentação.

Suomi
Käytä ainoastaan pakkauksen mukana toimitettuja kaapeleita ja varusteita. Älä käytä muita varusteita tai kaapeleita ellei näin ole erityisesti ohjeistettu asiakirjoissa.

Svensk
Använd bara kablar och tillbehör som ingår i förpackningen. Använd inte andra tillbehör eller kablar om du inte får uttryckliga instruktioner om det i dokumentationen.

Türk
Yalnızca pakette bulunan kablo ve aksesuarları kullanın. Belgelerde özellikle belirtilmedikçe başka aksesuar ve kablolar kullanmayın.

한국에서 구입 고객

KC

기종별	사 용 자 안 내 문
B급 기기(가정용 정보통신기기)	이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든지역에서 사용할 수 있습니다.